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The State of Canada's Forests
2001-2002

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Reflections of a Decade
Johannesburg

Canada

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MINISTER'S MESSAGE

Sustainable development in the forest sector, as in the natural resources sector as a whole, is more than a destination—it's an entire journey. Many diverse groups are taking this journey, and along the way they are learning from each other's experiences, sharing best practices and available scientific knowledge, and adjusting to new and evolving expectations of our forests.

Although Canada has been implementing sustainable forest management practices for decades, the international journey essentially began at the Earth Summit in Rio de Janeiro in 1992. After ten years of pursuing these objectives, the world will reflect upon its progress in Johannesburg in August 2002.

The Forest Principles agreed to at Rio helped to guide Canada and the international community in the journey toward sustainable forest management. At the second session of the United Nations Forum on Forests, March 2002 in New York, Canada continued to advocate that sustainable management of the world's forests requires more than voluntary efforts. Canada is continuing to pursue the adoption of a legally binding instrument on all types of forests that would provide a common understanding of what it means to implement sustainable forest management and include a compliance regime.

At the sixth conference of the Parties to the Convention on Biological Diversity, April 2002, I proposed to establish national compliance mechanisms to help protect the biodiversity of the world's forests. I believe that an ongoing assessment of our performance is essential to ensure conservation and sustainability.

This twelfth annual report on the state of Canada's forests looks back at some of Canada's notable accomplishments over the past ten years, and how they meet the Rio Forest Principles. The special articles on existing and emerging initiatives depict how Canadian society has embraced the principles — most notably in the areas of conservation and sustainability — as it develops and implements its national forest strategy, sets up on-the-ground forest management strategies and makes advances in research.

Canada's forest sector now has a better appreciation of the biodiversity and the social, cultural and economic importance of our forests. Canadians are keen to conserve their forests and use them sustainably for the well-being of present and future generations. The Government of Canada is committed to encouraging the sustainable management of our forests, as part of our commitment to ensuring a clean, healthy environment and preserving our natural spaces, which are essential parts of our quality of life.

I am proud of what Canada's forest sector has accomplished over the past decade and I look forward to working with both the national and international forest communities in the journey to advance sustainable forest management into the 21st century.

Herb Dhaliwal

The Honourable Herb Dhaliwal
Minister of Natural Resources Canada

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Up Front

AN OVERVIEW OF CANADA'S FORESTS

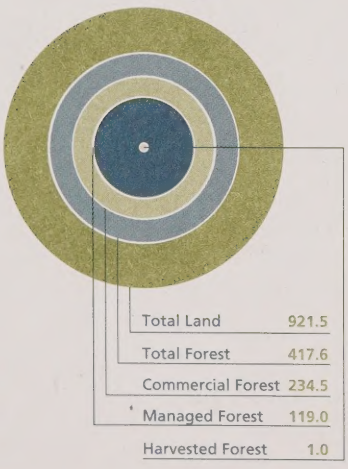
A SEA OF TREES... A FOREST OF DREAMS...

Trying to describe the Canadian forest is like trying to describe the sea. You see it, but you can't hold it with a look; you admire it even as you fear it; it seems the same, but is constantly changing; it's quiet on the surface, but ready to burst into a torrent of flames. It is vast, diverse, living and working.

Vastness...

The boreal and temperate forests cover approximately half of Canada's landmass, about 417 million hectares. They stretch from the Atlantic to the Pacific, slowly pushing back the Arctic tree line. By themselves, the forests that have commercial potential and can be sustainably harvested would occupy a space the size of the Mediterranean Sea. Just about half of these (119 million hectares) are managed primarily for timber production, while the rest remain inaccessible or have not been allocated for this purpose. Nineteen percent of commercial forest lands in Canada are classified as being under policy constraint. This area includes forest land that will not be harvested due to policy or legislative guidelines. This could mean, for example, land that serves as a buffer along a watercourse, or that is owned by or managed through agreements with conservation agencies. The non-commercial forest land (183.1 million hectares) is composed of open forests comprising natural areas of small trees, shrubs and muskegs.

Canada's Forests
(million hectares)



Despite the pivotal role they have played in the nation's development over the last four centuries, the forests of eastern Canada still occupy more than half their original area.

A world of diversity...

There are some 140 000 species in Canada. Forests provide a variety of habitats to approximately two thirds of all these species of plant, animal and micro-organism. Trees, which represent some 180 species, have created a rich diversity of forest ecosystems.

There are 15 terrestrial ecozones within Canada, containing forest types ranging from the towering coastal rainforests of British Columbia to the sparse and slow-growing forests at the Arctic tree line. Each region presents a particular distribution of animal and plant species. The majority of our forests are located within eight of these ecosystems. Based on age, approximately 18% of Canadian forests can be classified as old growth. Based on whether the forest has ever been harvested, that figure may reach 70%.

Planetary life support system...

With about 10% of the world's forests and more than 20% of the planet's freshwater, Canada's forest lands play a major role in the delicate balance of life. They have an important moderating effect on climate conditions, they filter our air and water, and they rebuild and regenerate soils, preventing

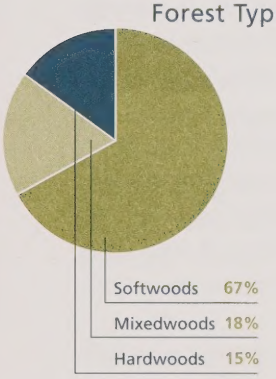
erosion. Forests provide a sanctuary that is essential for the incubation and maintenance of terrestrial life.

An economic mammoth...

Canada's forests are the engine behind a $74-billion industry. They help drive the Canadian economy by generating more than $34 billion toward the trade surplus, by creating direct employment for close to 353 000 Canadians, and by acting as backdrop for a tourism industry worth several billion dollars.

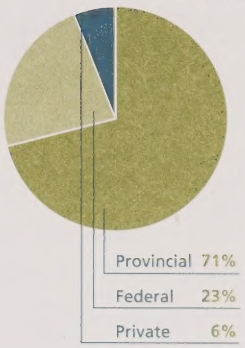
Roughly 0.4 %, or about one million hectares, of Canada's commercial forests are harvested yearly. Each province or territory establishes Annual Allowable Cuts, which are based on the average volume of wood that may be harvested under sustained yield management. More than half the harvested area is left to regenerate naturally, usually after some form of preparatory site treatment. The remaining areas are seeded or replanted. Roughly 1.6% of Canada's forests are affected by fire, insects and disease each year, and they are also left to regenerate naturally.

Canada's Forest Types



Canada is unique in that 94% of its forest lands are publicly owned. Under the Canadian Constitution, the provinces have ownership over most publicly owned forest land—71% of the total forest land—and are legally responsible for it. The federal government's responsibility for forests is based on its ownership of 23% of Canada's total forest land, most of which is located in the territories. The federal government has, however, devolved responsibility for management to the territorial governments (devolution to the Government of the Yukon is to be completed in 2003).

Forest Land Ownership



Six percent of Canada's forest land is owned by an estimated 425 000 individuals, families, communities and forest companies. These privately owned forests, of which 80% are located east of Manitoba and mostly in the Atlantic provinces, are generally productive and of high quality. They are the source of 19% of Canada's industrial roundwood production (logs, bolts and pulpwood), 77% of maple products, 79 % of fuelwood and firewood, as well as virtually all of the nation's Christmas trees.

Today, each province or territory has its own legislation, regulations, standards and programs through which it allocates forest harvesting rights and management responsibilities. In addition, many provinces and territories have legislation that provides for public participation as part of the forest management planning and allocation process. The broad spectrum of forest user—the public, forest industries, Aboriginal groups and environmental organizations—are consulted in order to ensure that recreational, cultural, wildlife and economic values are incorporated into forest management planning and decision making.

Hereafter...

Forests have always been a part of Canadians' collective consciousness. Source of life or threat to survival, they were part of every struggle, with us or against us. For our ancestors, who toiled to build this country, the forests were the beacon for a better life. This stage of our development belongs to us. We are at peace with our forests. Together, we are creating a framework for coexistence with our forests, because they may well be the keepers of the dreams of future generations.

YEAR IN REVIEW
2001-2002

The past year was particularly eventful for Canada's forest sector. Stakeholders at all levels worked cooperatively to implement and entrench sustainable forest management on every conceivable front. From manuals and procedures for forest managers to new registration systems and land-use inventories, sustainable forestry has become the overriding principle that governs every aspect of how Canadians use and perceive their forests.

ENTRENCHING SUSTAINABLE FOREST MANAGEMENT AND INDICATORS

Beginning in the east, on February 25, 2002 **Newfoundland and Labrador** announced the annual allowable cut (AAC) for the island portion of the province. This followed two years of analysis and the use of a more refined wood supply model for calculating sustainable harvest levels. The new Base AAC (stands that are easy to access and economical to harvest) is 1 797 500 m^3, a 12% reduction over the 1996 AAC. However, the new total provincial AAC of 2 004 800 m^3, which includes the Partition component (stands that are harder to access) of 207 300 m^3, is only 2% less than 1996 harvest levels.

In **New Brunswick** a comprehensive study, funded jointly by the Forest Products Association of Canada and the N.B. Department of Natural Resources and Energy, will assess the potential for improvement in the development, allocation and management of timber resources on Crown land.

Ontario released the *Forest Management Guide for Natural Disturbance Pattern Emulation* in November 2001. The new Guide promotes a more natural approach to harvesting timber in Crown forests, including the retention of individual trees and insular and peninsular patches of standing trees.

Ontario also released, in March 2002, its first *State of the Forest Report*. This document meets the requirements of *Ontario's Environmental Assessment and Crown Forest Sustainability Acts*, which include the use of criteria and indicators of sustainable forest management in public reporting.

In the summer of 2001, **Manitoba** adopted new principles and guidelines to ensure that sustainable development objectives are considered in all government initiatives. The government also released the recent report of the *Manitoba Round Table on Sustainable Development* on sustainability indicators. In March 2002, Manitoba published *Next Steps: Priorities for Sustaining Manitoba's Forests*. This document outlines the direction for government, industry and First Nations to help Manitoba's forests continue to thrive.

The **Saskatchewan** government, in collaboration with forest scientists and the industry, developed *The Forest Management Effects Monitoring Program* to improve the forest management activities of Saskatchewan forest companies. Over the next two years, companies will collect and share information on a series of environmental indicators.

PUBLIC CONSULTATIONS

The ownership and use of private lands in **Nova Scotia** is of significant concern given the predominance of private ownership of natural resources in that province. A special panel struck by the government produced its final report in 2001 and made 21 specific recommendations with regard to public concerns over non-resident ownership issues.

In the fall of 2001, **Quebec** released its *Consultation Policy on Directions for Quebec on Forest Management and Development*. Consultations were carried out in order to obtain input from residents, forest users, and First Nations communities on the bill's contents and to seek recommendations on the most appropriate way to consult in the future. These consultations were completed in late February 2002, and a policy will soon be submitted to the Government of Quebec for approval.

On April 4, 2002, another public consultation was launched in Quebec to determine the opinions of residents and interested parties on the delineation of the northern limit for commercial wood allocations and the demarcation of forestry management units.

Ontario is preparing a proposal to amend and extend the *Environmental Assessment Act* approval for forest management activities on Crown land, which expires in May 2003. Opportunities for public review and comment are being provided.

The Government of **Alberta** invited Albertans to participate in a comprehensive outreach and consultation process for the development of a provincial strategy for sustainable water that will identify short-, medium- and long-term actions. Some components of the strategy could be implemented as early as the fall of 2002.

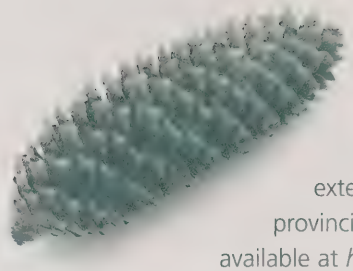
ABORIGINAL PARTICIPATION

The Government of **Quebec** and the Grand Council of Crees signed an historic agreement, the *Braves' Peace*, on February 7, 2002. The forestry component of the agreement is aimed at greater participation of Cree communities and more consideration of the Cree way of life in the management of forest resources. It anticipates adapting the application of the Quebec Forestry Regime to their particular context. The agreement also provides for the creation of two joint development mechanisms: the Cree-Quebec Council on Forestry, and joint working groups in Cree communities.

In November 2001, **Iisaak Forest Resources Limited**, an innovative First Nations-run forest services company operating exclusively in Clayoquot Sound, B.C., received the World Wildlife Fund *Gift to the Earth* award. Iisaak was recognized for its outstanding environmental and social commitment to the forests. The company also earned FSC certification in July 2001 for its Tree Farm Licence operation.

TAKING STOCK: PROTECTING ECOSYSTEMS AND SPECIES

Prince Edward Island is currently conducting a comprehensive land-use inventory in order to examine current land uses such as agriculture, forest conversions, wildlife habitat requirements, and soil erosion potential, and to assess the impact of the current forest harvest. Complete sets of aerial photos covering all of Prince Edward Island are now available on-line and free-of-charge at *http://www.gov.pe.ca/aerialsurvey/index.php3*. The photos were collected in 1935, 1958, 1974, 1990, and 2000, and provide a glimpse of land-use patterns and changes over the last 70 years.



Significant progress was made in **Nova Scotia's** *Forest Strategy* with the adoption of the *Wildlife Habitat and Watercourses Protection Regulations*, applicable on all private land as well as Crown tenures. The regulations will help ensure the sustainability of woodland diversity, water quality and wildlife habitat on all lands under forest production.

Under its *Protected Areas Initiative*, **Manitoba** declared seven new park reserves in 2001. To date, 32 provincial parks and park reserves, 16 ecological reserves, 32 wildlife management areas as well as provincial forests and federal parks comprise Manitoba's Network of Protected Areas. The province continues to work on protected areas in cooperation with First Nations through a memorandum of understanding that extends to March 2003.

Alberta made significant progress in protecting its "special places". The five-and-a-half-year initiative concluded in 2001 with the designation of five new sites, including the largest site ever established by the province. The new protected areas designated by the province add more than 697 000 hectares to the existing provincial parks system.

The forest management program of the Government of the **Northwest Territories** has completed its satellite-based vegetation classification of the territory's forest lands. This will be one of the key sources of data for the NWT contribution to the National Forest Inventory and the reporting of change over time. It will also make an important contribution to the biophysical database being developed to support resource management decisions in advance of the Mackenzie Valley gas pipeline.

Wild Species 2000: The General Status of Species in Canada, the first national compilation of species status assessments, was released by COSEWIC (Committee on the Status of Endangered Species in Canada) in the spring of 2001. The report is the result of extensive collaboration among the federal, provincial and territorial governments, and is available at *http://www.wildspecies.ca*.

In November 2001 **Wildlife Habitat Canada** (WHC) and its partners released *The Status of Wildlife Habitats in Canada*, a comprehensive new report on the state of wildlife habitats in Canada. Of particular interest are the wildlife habitats in the forested areas of Canada. The analysis provided in the WHC report is consistent with the objectives and scope of the National Forest Strategy and Accord.

LEGISLATIVE CHANGES TO PROMOTE SUSTAINABILITY

The Government of **British Columbia** amended the *Forest Practices Code of British Columbia Act* and *Regulations* in 2001 to fine-tune operational planning requirements and enable a second *Forest Practices Code* pilot project. On May 1, 2002 the government released a discussion paper proposing a substantively revised new Code. Public consultations will help develop a workable, results-based Code that reduces costs and administrative burdens, ensures tough penalties for non-compliance, and measures performance against legally binding standards.

In **Nunavut**, extensive consultations on creating a new *Wildlife Act* commenced in April 2002. The existing Act was originally passed by the Government of the Northwest Territories in 1978, and requires updating and amendments in a number of areas.

This was a very eventful year for the **Yukon** in terms of legislative change. Amendments to the *Yukon Timber Regulations* of the *Territorial Lands Act* came into force on May 3, 2001. The amendments clarify several sections of the timber permitting process and include provisions

Corner Brook, **Newfoundland** has been designated **"Forest Capital of Canada"** for 2002 by the Canadian Forestry Association. Each year, a city with a multi-faceted involvement with the forests is honoured by the association *http://www.canadianforestry.com*.

for market-driven stumpage rates and reforestation charges for Crown timber that reflect the actual costs of regeneration on harvested lands.

An act to officially recognize the Sub-alpine Fir as the Yukon's official tree was tabled in the Legislative Assembly, and the new *Yukon Wildlife Act* was proclaimed into law as of April 1, 2002. The new Act will ensure that enforcement and administrative provisions are consistent with the modern practices reflected in resource management legislation in other Canadian jurisdictions.

The Yukon government also completed a "renewal of government" initiative that transferred responsibility for forest-related issues from the now defunct Department of Renewable Resources to the new Department of Energy, Mines and Resources. This department has also been identified as the post-devolution home for forestry staff currently employed by the federal Department of Indian Affairs and Northern Development.

Bill C-5, the ***Species at Risk Act*** (SARA), was introduced in the House of Commons on February 2, 2001. The Standing Committee on Environment and Sustainable Development heard testimony from more than 90 witnesses, after which it tabled its report in the House on December 3, 2001. Report Stage on the bill began in February 2002, culminating in Third Reading by the House on June 11, the bill was then tabled in the Senate on June 12. The Senate is scheduled to continue review of the bill when it resumes sitting in September 2002. The federal government and the provinces are currently developing bilateral agreements to guide implementation of SARA once the bill is proclaimed.

REGISTRATION, CERTIFICATION AND STANDARDIZATION

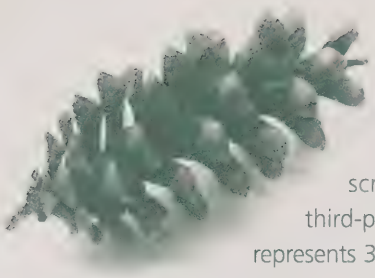
A new load slip system (document-based monitoring system) for the forest industry in **Newfoundland and Labrador** will be implemented in the summer of 2002 to allow for more accurate tracking of commercially harvested wood and to help reduce the problem of unreported harvesting and processing of timber. Individuals failing to comply with the regulations will be subject to penalties under the *Forestry Act*.

New Brunswick has introduced a wood tracking system in order to stem the problem of wood theft from private lots and to provide accurate data on harvest levels. Any vehicle hauling round wood on public highways must now have a Transportation Certificate issued by the forest products marketing boards.

On another front, New Brunswick plans to become the first province in Canada to obtain independent certification for all forest operations on Crown land. Phase One of the process will ensure that forestry operations on Crown land become ISO 14001 certified by December 31, 2002. Phase Two will require forestry operations on Crown land to be independently certified by a third party as of December 31, 2003.

In October 2001, **British Columbia** replaced *Forest Renewal BC* with a new *Forest Investment Account* to be overseen by government and delivered by industry. The new funding mechanism was designed to help achieve a globally recognized regime of sustainable forest management. It will support several distinct programs focusing on land-based improvements and studies, forestry research, product development, and international marketing.

On January 28, 2002, the **Forest Products Association of Canada** (FPAC) became the first industry association to require all member



companies to submit their practices to the scrutiny of independent third-party forest audits. FPAC represents 30 of the country's largest producers of pulp, paper and wood products, and its members are responsible for over 75% of the working forests in Canada. This means that by 2006, at least 75% of Canada's working forests will be certified to one of three forestry-specific standards: CSA, FSC or SFI. In March 2002, FPAC received the GLOBE Foundation Industry Award for Environmental Performance in recognition of the certification process and its significance for sustainable forestry.

FIRES AND PESTS

A new *Forest Fire Management Strategy for Ontario* has been produced as a result of *Ontario's Living Legacy*, and should be implemented for the 2003 fire season. The strategy provides direction to the fire management program in **Ontario** for protecting values and forests while supporting ecologically sound resource management.

Manitoba's model forest developed *A Guide to Harvesting Practices to Regenerate a Natural Forest*. These guidelines are intended to assist operators in areas where large wildfires are the main forest disturbance *http://www.manitobamodelforest.net*.

On March 25, 2002, **Saskatchewan** entered into a partnership agreement on a new five-year firefighting program focusing on training the next generation of firefighters for northern communities.

Saskatchewan's summer 2001 survey on Dutch elm disease identified the disease in six previously unaffected communities, and confirmed continuing infections in many other areas.

ANNIVERSARIES

2001 marked a number of forest-related anniversaries throughout the country.

- **Prince Edward Island** celebrated the 50th anniversary of the founding of its first government forest service.

- There have now been 100 years of "Planting for the Future" at the Prairie Farm Rehabilitation Administration's Shelterbelt Centre, Agriculture and Agri-Food Canada, in Indian Head, **Saskatchewan**.

- Although the **University of British Columbia** has been offering forestry programs since 1921, this year marked the 50th anniversary of the establishment of its Faculty of Forestry.

- The **Committee on the Status of Endangered Wildlife in Canada** (COSEWIC) marked 25 years of work to determine the at-risk status of species in Canada. This independent committee assessed 573 species over the last quarter century. COSEWIC membership includes scientific experts from government and non-government agencies and academic organizations across Canada. An Aboriginal Traditional Knowledge sub-committee has recently been added *http://www.cosewic.gc.ca*.

Alberta recorded its longest fire season in 2001, with 974 wildfires burning over 153 459 hectares of forested land in the province. The government has enhanced the FireSmart program (a video and manual) to help communities recognize and reduce fire-related threats to existing developments and prevent hazards through better planning. As well, Alberta wildfire crews will be cross-trained to fight fires in homes and buildings to better protect rural communities.

A wide-ranging strategic action plan was prepared to respond to the largest mountain pine beetle infestation in the history of **British Columbia**. The plan was the result of extensive consultations, and incorporated recommendations from a government task force of elected representatives established in the summer of 2001. As part of the plan, sections of the *Forest Practices Code* were amended late last year to allow for the designation of emergency management areas in which logging approvals were sped up to ensure that newly attacked trees could be harvested before beetles matured and spread from them.

INNOVATION

A **Saskatchewan Forest Centre** located in Prince Albert was established on September 1, 2001. The new Centre focuses on agroforestry, value-added opportunities, and forest science to support expansion of the province's forest industry. In June 2001, **Saskatchewan** announced a major package of forestry developments for northwest Saskatchewan, including a new Oriented Strand Board mill and enhanced wood allocations for community-based partnerships. Construction on the OSB mill was expected to begin in the spring of 2002.

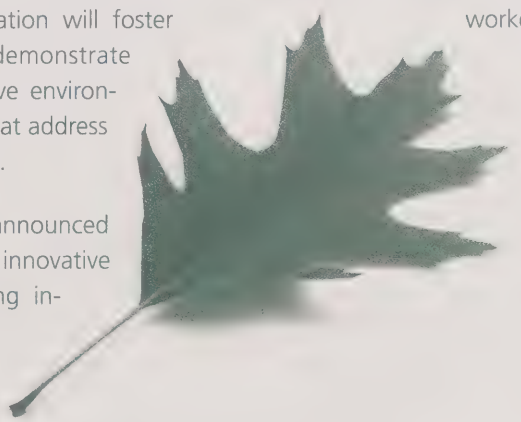
On March 26, 2002 the Government of Canada appointed the Chairperson, initial Directors and Members of the **Canada Foundation for Sustainable Development Technology,** which was established to help Canada reduce its greenhouse gas emissions and improve its air quality. The Foundation will foster partnerships to develop and demonstrate leading-edge technologies to achieve environmental benefits, particularly those that address climate change and air-quality issues.

In early April 2002 **Genome Canada** announced new investments to support three innovative forestry genomics projects. Including investments announced in April 2001, Genome Canada has funded more than $14 million in four forestry projects across Canada. When matched with other funding, this amounts to $28 million in forestry genomics research. A detailed list of approved projects is available from *http://www.genomecanada.ca*.

TRADE AND RECIPROCITY

Following the expiry of the five-year **Canada-US Softwood Lumber Agreement** on March 31, 2001, the US Coalition for Fair Lumber Imports filed countervailing duty and anti-dumping suits against Canadian softwood lumber. The federal, provincial and territorial governments and the Canadian forest industry were active on two fronts: defending current forest policies and practices, and engaging in discussions and negotiations aimed at reaching a durable resolution to this long-standing trade dispute. The talks failed in late March, and the US imposed combined duties of 27.22% in May 2002.

On August 12, 2001 all of the **Registered Professional Foresters Associations** in Canada and the **Canadian Institute of Forestry** signed a *Mutual Recognition Agreement* to facilitate movement of professional foresters between provinces having provincial forestry regulatory bodies. The Agreement meets the obligations of the Agreement on Internal Trade requiring governments and regulatory bodies to mutually recognize workers' qualifications.



PROFILES
ACROSS THE NATION

Canada

Population (2001)
31.1 million
Total area
997.0 million ha
Land area
921.5 million ha
Forest land
417.6 million ha
National parks
24.5 million ha
Provincial parks
32.3 million ha

FOREST RESOURCE

Ownership	
Provincial	71%
Federal	23%
Private	6%
Forest type	
Softwood	67%
Mixedwood	18%
Hardwood	15%
Annual allowable cut (1999)[a]	225.3 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	193.2 million m^3
Harvest (area) Industrial roundwood (1999)	1.03 million ha
Status of harvested Crown land (1999)[c]	
Stocked (88%)	14.5 million ha
Understocked (12%)	2.0 million ha
Area defoliated by insects (1999)[d]	6.3 million ha
Area burned (2001)[e]	629 836 ha

FOREST INDUSTRY

Value of exports (2001)	$44.1 billion
Other paper and paperboard	25%
Softwood lumber	25%
Newsprint	16%
Wood pulp	16%
Other products	14%
Waferboard	4%
Major export markets (2001)	
United States	81%
European Union	6%
Japan	6%
Other countries	5%
South and Central America	2%
Balance of trade (2001)	$34.4 billion
Contribution to GDP (2001)	$28.5 billion
Value of shipments (1999)	$73.6 billion
Exported	60%
Sold domestically	40%
Number of establishments (1999)	12 348
Logging (1999)	9 541
Wood product manufacturing (1999)	2 144
Paper manufacturing (1999)	663
Direct jobs (2001)	352 800
Wages and salaries (1999)	$12.3 billion
New investments (2001)	$3.1 billion

a, b, c, d, e see page 21

Newfoundland and Labrador

Population
533 761
Total area
40.6 million ha
Land area
37.2 million ha
Forest land
22.5 million ha
Provincial parks
439 400 ha

FOREST RESOURCE

Ownership	
Provincial*	99%
Private	1%
Forest type	
Softwood	91%
Mixedwood	8%
Hardwood	1%
Annual allowable cut (1999)[a]	2.7 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	2.7 million m^3
Harvest (area) Industrial roundwood (1999)	17 415 ha
Status of harvested Crown land (1999)[c]	
Stocked (81%)	326 000 ha
Understocked (19%)	78 000 ha
Area defoliated by insects (1999)[d]	35 121 ha
Area burned (2001)	1 275 ha

FOREST INDUSTRY

Value of exports (2001)	$642.1 million
Newsprint	95%
Softwood lumber	5%
Major export markets (2001)	
United States	59%
European Union	24%
South and Central America	13%
Other countries	4%
Balance of trade (2001)	$625.4 million
Value of shipments (1999)	not available
Logging (1999)	$137.9 million
Wood product manufacturing (1999)	$58.1 million
Paper manufacturing (1999)	not available
Number of establishments (1999)	136
Logging (1999)	94
Wood product manufacturing (1999)	35
Paper manufacturing (1999)	7
Direct jobs (2001)	3 900
Wages and salaries (1999)	not available
Logging (1999)	$32.5 million
Wood product manufacturing (1999)	$11.6 million
Paper manufacturing (1999)	not available
New investments (2001)	not available

**Timber and property rights for 69% of the Crown land on the island of Newfoundland has been conveyed to pulp and paper companies through 99 year licences issued under the 1905 Pulp and Paper Manufacturing Act and 1935 Bowater Act. Therefore, the Province's financial and legal system treats this licensed land as private property.*

Prince Edward Island

Population
138 514
Total area
0.57 million ha
Land area
0.57 million ha
Forest land
0.29 million ha
Provincial parks
1 500 ha

FOREST RESOURCE

Ownership	
Provincial	7%
Federal	1%
Private	92%
Forest type	
Softwood	35%
Mixedwood	35%
Hardwood	30%
Annual allowable cut (1999)[a]	0.5 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	0.7 million m^3
Harvest (area) Industrial roundwood (1999)	5 780 ha
Status of harvested Crown land (1999)[c]	
Stocked (100%)	44 500 ha
Area defoliated by insects (2001)[d]	0 ha
Area burned (2001)	27 ha

FOREST INDUSTRY

Value of exports (2001)	$14.8 million
Softwood lumber	84%
Other paper and paperboard	9%
Other products	7%
Major export markets (2001)	
United States	98%
Other countries	2%
Balance of trade (2001)	$14.7 million
Value of shipments (1999)	not available
Logging (1999)	$7.8 million
Wood product manufacturing (1999)	$41.1 million
Paper manufacturing (1999)	not available
Number of establishments (1999)	59
Logging (1999)	47
Wood product manufacturing (1999)	8
Paper manufacturing (1999)	4
Direct jobs (2001)	600
Wages and salaries (1999)	not available
Logging (1999)	$2.0 million
Wood product manufacturing (1999)	$6.0 million
Paper manufacturing (1999)	not available
New investments (2001)	not available

Nova Scotia

Population
942 691
Total area
5.6 million ha
Land area
5.3 million ha
Forest land
3.9 million ha
Provincial parks
30 507 ha

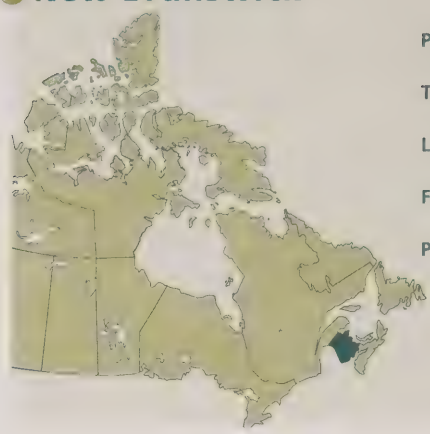
FOREST RESOURCE

Ownership	
Provincial	28%
Federal	3%
Private	69%
Forest type	
Softwood	45%
Mixedwood	22%
Hardwood	33%
Annual allowable cut (1999)[a]	6.7 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	6.2 million m^3
Harvest (area) Industrial roundwood (1999)	49 680 ha
Status of harvested Crown land (1999)[c]	
Stocked (97%)	191 000 ha
Understocked (3%)	6 600 ha
Area defoliated by insects (2001)[d]	0 ha
Area burned (2001)	530 ha

FOREST INDUSTRY

Value of exports (2001)	$1.1 billion
Newsprint	28%
Other paper and paperboard	28%
Wood pulp	20%
Softwood lumber	18%
Other products	6%
Major export markets (2001)	
United States	72%
South and Central America	12%
European Union	10%
Other countries	6%
Balance of trade (2001)	$1.1 billion
Value of shipments (1999)	$1.8 billion
Logging (1999)	$247.6 million
Wood product manufacturing (1999)	$455.3 million
Paper manufacturing (1999)	$1.1 billion
Number of establishments (1999)	675
Logging (1999)	598
Wood product manufacturing (1999)	65
Paper manufacturing (1999)	12
Direct jobs (2001)	11 900
Wages and salaries (1999)	$296.7 million
Logging (1999)	$35.9 million
Wood product manufacturing (1999)	$77.7 million
Paper manufacturing (1999)	$183.1 million
New investments (2001)	not available

New Brunswick



Population
757 077
Total area
7.3 million ha
Land area
7.2 million ha
Forest land
6.1 million ha
Provincial parks
23 451 ha

FOREST RESOURCE

Ownership	
Provincial	48%
Federal	1%
Private	51%
Forest type	
Softwood	47%
Mixedwood	29%
Hardwood	24%
Annual allowable cut (1999)[a]	11.1 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	11.3 million m^3
Harvest (area) Industrial roundwood (1999)	111 077 ha
Status of harvested Crown land (1999)[c]	
Stocked (95%)	572 000 ha
Understocked (5%)	31 000 ha
Area defoliated by insects (2001)[d]	760 ha
Area burned (2001)	604 ha

FOREST INDUSTRY

Value of exports (2001)	$2.5 billion
Other paper and paperboard	31%
Softwood lumber	24%
Wood pulp	21%
Newsprint	12%
Other products	11%
Major export markets (2001)	
United States	84%
Other countries	6%
European Union	5%
Japan	3%
South and Central America	2%
Balance of trade (2001)	$2.2 billion
Value of shipments (1999)	$4.2 billion
Logging (1999)	$722.7 million
Wood product manufacturing (1999)	$1.3 billion
Paper manufacturing (1999)	$2.1 billion
Number of establishments (1999)	1 063
Logging (1999)	936
Wood product manufacturing (1999)	102
Paper manufacturing (1999)	25
Direct jobs (2001)	18 300
Wages and salaries (1999)	$621.3 million
Logging (1999)	$99.8 million
Wood product manufacturing (1999)	$212.3 million
Paper manufacturing (1999)	$309.2 million
New investments (2001)	not available

Quebec

Population
7.4 million
Total area
154.1 million ha
Land area
135.7 million ha
Forest land
83.9 million ha
Provincial parks
7.2 million ha

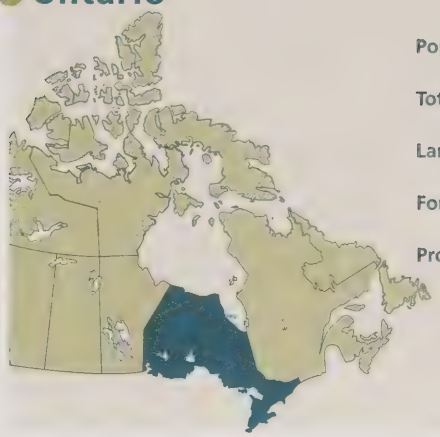
FOREST RESOURCE

Ownership	
Provincial	89%
Private	11%
Forest type	
Softwood	58%
Mixedwood	23%
Hardwood	19%
Annual allowable cut (1999)[a]	58.2 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	43.3 million m^3
Harvest (area) Industrial roundwood (1999)	384 208 ha
Status of harvested Crown land (2000)[c]	
Stocked (96%)	5.6 million ha
Understocked (4%)	208 000 ha
Area defoliated by insects (2001)[d]	1.1 million ha
Area burned (2001)	33 068 ha

FOREST INDUSTRY

Value of exports (2001)	$12.2 billion
Other paper and paperboard	34%
Newsprint	25%
Other products	16%
Softwood lumber	15%
Wood pulp	7%
Waferboard	3%
Major export markets (2001)	
United States	88%
European Union	6%
Other countries	4%
South and Central America	2%
Balance of trade (2001)	$10.4 billion
Value of shipments (1999)	$20.3 billion
Logging (1999)	$1.9 billion
Wood product manufacturing (1999)	$7.7 billion
Paper manufacturing (1999)	$10.7 billion
Number of establishments (1999)	3 178
Logging (1999)	2 265
Wood product manufacturing (1999)	702
Paper manufacturing (1999)	211
Direct jobs (2001)	109 300
Wages and salaries (1999)	$3.3 billion
Logging (1999)	$255.5 million
Wood product manufacturing (1999)	$1.3 billion
Paper manufacturing (1999)	$1.8 billion
New investments (2001)	$1.0 billion

Ontario



Population
11.9 million
Total area
106.9 million ha
Land area
89.1 million ha
Forest land
58.0 million ha
Provincial parks
7.0 million ha

FOREST RESOURCE

Ownership	
Provincial	88%
Federal	1%
Private	11%
Forest type	
Softwood	50%
Mixedwood	27%
Hardwood	23%
Annual allowable cut (1999)[a]	0.4 million ha
Harvest (volume) Industrial roundwood (2000)[b]	28.1 million m^3
Harvest (area) Industrial roundwood (1999)	201 522 ha
Status of harvested Crown land (1999)[c]	
Stocked (87%)	3.9 million ha
Understocked (13%)	565 000 ha
Area defoliated by insects (2001)[d]	13.5 million ha
Area burned (2001)	10 733 ha

FOREST INDUSTRY

Value of exports (2001)	$9.5 billion
Other paper and paperboard	40%
Newsprint	18%
Other products	16%
Wood pulp	11%
Softwood lumber	9%
Waferboard	6%
Major export markets (2001)	
United States	97%
European Union	1%
South and Central America	1%
Other countries	1%
Balance of trade (2001)	$3.7 billion
Value of shipments (1999)	$15.8 billion
Logging (1999)	$1.6 billion
Wood product manufacturing (1999)	$5.1 billion
Paper manufacturing (1999)	$9.1 billion
Number of establishments (1999)	2 421
Logging (1999)	1 657
Wood product manufacturing (1999)	475
Paper manufacturing (1999)	289
Direct jobs (2001)	83 500
Wages and salaries (1999)	$2.8 billion
Logging (1999)	$230.7 million
Wood product manufacturing (1999)	$924.3 million
Paper manufacturing (1999)	$1.7 billion
New investments (2001)	$0.7 billion

Manitoba

Population
1.2 million
Total area
65.0 million ha
Land area
54.8 million ha
Forest land
26.3 million ha
Provincial parks
2.6 million ha

FOREST RESOURCE

Ownership	
Provincial	94%
Federal	1%
Private	5%
Forest type	
Softwood	59%
Mixedwood	20%
Hardwood	21%
Annual allowable cut (1999)[a]	9.6 million m^3
Harvest (volume) Industrial roundwood (1999)[b]	2.2 million m^3
Harvest (area) Industrial roundwood (1999)	15 509 ha
Status of harvested Crown land (1999)[c]	
Stocked (94%)	277 000 ha
Understocked (6%)	17 000 ha
Area defoliated by insects (1998)[d]	181 614 ha
Area burned (2001)	86 199 ha

FOREST INDUSTRY

Value of exports (2001)	$593.4 million
Other products	28%
Other paper and paperboard	23%
Newsprint	20%
Softwood lumber	16%
Waferboard	13%
Major export markets (2001)	
United States	99%
Other countries	1%
Balance of trade (2001)	$216.5 million
Value of shipments (1999)	$1.1 billion
Logging (1999)	$124.3 million
Wood product manufacturing (1999)	$525.5 million
Paper manufacturing (1999)	$422.6 million
Number of establishments (1999)	248
Logging (1999)	179
Wood product manufacturing (1999)	48
Paper manufacturing (1999)	21
Direct jobs (2001)	8 800
Wages and salaries (1999)	$397.5 million
Logging (1999)	$15.5 million
Wood product manufacturing (1999)	$91.2 million
Paper manufacturing (1999)	$290.8 million
New investments (2001)	not available

Saskatchewan

Population
1.0 million
Total area
65.2 million ha
Land area
57.1 million ha
Forest land
28.8 million ha
Provincial parks
1.2 million ha

FOREST RESOURCE

Ownership	
Provincial	97%
Federal	2%
Private	1%
Forest type	
Softwood	39%
Mixedwood	25%
Hardwood	36%
Annual allowable cut (1999)[a]	0.7 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	4.5 million m^3
Harvest (area) Industrial roundwood (1999)	21 169 ha
Status of harvested Crown land (1999)[c]	
Stocked (36%)	150 000 ha
Understocked (64%)	269 000 ha
Area defoliated by insects (2001)[d]	438 883 ha
Area burned (2001)	183 820 ha

FOREST INDUSTRY

Value of exports (2001)	$656.8 million
Other paper and paperboard	40%
Wood pulp	36%
Softwood lumber	21%
Waferboard	2%
Other products	1%
Major export markets (2001)	
United States	80%
European Union	9%
Other countries	7%
South and Central America	2%
Japan	2%
Balance of trade (2001)	$544.2 million
Value of shipments (1999)	$927.7 million
Logging (1999)	$175.0 million
Wood product manufacturing (1999)	$335.5 million
Paper manufacturing (1999)	$417.2 million
Number of establishments (1999)	283
Logging (1999)	237
Wood product manufacturing (1999)	40
Paper manufacturing (1999)	6
Direct jobs (2001)	5 100
Wages and salaries (1999)	$155.9 million
Logging (1999)	$23.2 million
Wood product manufacturing (1999)	$63.9 million
Paper manufacturing (1999)	$68.8 million
New investments (2001)	not available

Alberta

Population
3.1 million
Total area
66.1 million ha
Land area
64.4 million ha
Forest land
38.2 million ha
Provincial parks
1.9 million ha

FOREST RESOURCE

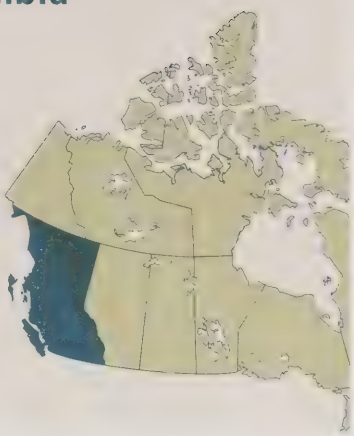
Ownership	
Provincial	87%
Federal	9%
Private	4%
Forest type	
Softwood	44%
Mixedwood	23%
Hardwood	33%
Annual allowable cut (1999)[a]	27.3 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	21.9 million m^3
Harvest (area) Industrial roundwood (1999)	42 210 ha
Status of harvested Crown land (1999)[c]	
Stocked (67%)	662 000 ha
Understocked (33%)	332 000 ha
Area defoliated by insects (2001)[d]	3.6 million ha
Area burned (2001)	153 459 ha

FOREST INDUSTRY

Value of exports (2001)	$2.8 billion
Wood pulp	46%
Softwood lumber	24%
Waferboard	12%
Other products	8%
Newsprint	7%
Other paper and paperboard	3%
Major export markets (2001)	
United States	71%
Other countries	12%
Japan	9%
European Union	8%
Balance of trade (2001)	$2.6 billion
Value of shipments (1999)	$4.8 billion
Logging (1999)	$621.3 million
Wood product manufacturing (1999)	$2.7 billion
Paper manufacturing (1999)	$1.5 billion
Number of establishments (1999)	651
Logging (1999)	478
Wood product manufacturing (1999)	145
Paper manufacturing (1999)	28
Direct jobs (2001)	20 800
Wages and salaries (1999)	$774.3 million
Logging (1999)	$95.7 million
Wood product manufacturing (1999)	$471.4 million
Paper manufacturing (1999)	$207.2 million
New investments (2001)	$0.3 billion

British Columbia

Population
4.1 million
Total area
94.8 million ha
Land area
93.0 million ha
Forest land
60.6 million ha
Provincial parks
11.3 million ha



FOREST RESOURCE

Ownership	
Provincial	95%
Federal	1%
Private	4%
Forest type	
Softwood	89%
Mixedwood	8%
Hardwood	3%
Annual allowable cut (1999)[a]	71.7 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	75.0 million m^3
Harvest (area) Industrial roundwood (1999)	176 312 ha
Status of harvested Crown land (1999)[c]	
Stocked (81%)	3.2 million ha
Understocked (19%)	737 000 ha
Area defoliated by insects (1999)[d]	not available
Area burned (2001)	9 668 ha

FOREST INDUSTRY

Value of exports (2001)	$14.1 billion
Softwood lumber	46%
Wood pulp	22%
Other products	15%
Other paper and paperboard	10%
Newsprint	4%
Waferboard	3%
Major export markets (2001)	
United States	65%
Japan	15%
Other countries	10%
European Union	9%
South and Central America	1%
Balance of trade (2001)	$12.9 billion
Value of shipments (1999)	$24.0 billion
Logging (1999)	$6.3 billion
Wood product manufacturing (1999)	$11.7 billion
Paper manufacturing (1999)	$6.1 billion
Number of establishments (1999)	3 634
Logging (1999)	3 050
Wood product manufacturing (1999)	524
Paper manufacturing (1999)	60
Direct jobs (2001)	90 600
Wages and salaries (1999)	$3.8 billion
Logging (1999)	$931.0 million
Wood product manufacturing (1999)	$1.9 billion
Paper manufacturing (1999)	$988.2 million
New investments (2001)	$0.6 billion

Yukon Territory

Population
29 885
Total area
48.3 million ha
Land area
47.9 million ha
Forest land
27.5 million ha

FOREST RESOURCE

Ownership	
Federal	100%
Forest type	
Softwood	79%
Mixedwood	19%
Hardwood	2%
Annual allowable cut (1999)[a]	352 200 m^3
Harvest (volume) Industrial roundwood (1999)[b]	253 326 m^3
Harvest (area) Industrial roundwood (1999)	1 034 ha
Status of harvested Crown land (1999)[c]	
Stocked (45%)	5 700 ha
Understocked (55%)	7 000 ha
Area defoliated by insects (1999)[d]	not available
Area burned (2001)	17 772 ha

FOREST INDUSTRY

Value of exports (2001)	$3.0 million
Softwood lumber	74%
Other products	24%
Waferboard	2%
Major export markets (2001)	
United States	100%
Balance of trade (2001)	$2.9 million

Northwest Territories

Population
40 860
Total area
342.6 million ha
Land area
329.3 million ha
Forest land
61.4 million ha

FOREST RESOURCE

Ownership	
Federal	100%
Forest type	
Softwood	33%
Mixedwood	58%
Hardwood	9%
Annual allowable cut (1999)[a]	236 500 m^3
Harvest (volume) Industrial roundwood (1999)[b]	71 271 m^3
Harvest (area) Industrial roundwood (1999)	547 ha
Status of harvested Crown land (1999)[c]	
Stocked (15%)	440 ha
Understocked (85%)	2 600 ha
Area defoliated by insects (1999)[d]	487 556 ha
Area burned (2001)	111 262 ha

FOREST INDUSTRY

Value of exports (2001)	$1.1 million
Softwood lumber	83%
Other products	17%
Major export markets (2001)	
United States	100%
Balance of trade (2001)	$1.1 million

Nunavut

Population
28 159
Total area
199.4 million ha

FOREST INDUSTRY

Value of exports (1999)	92 784
Softwood lumber	100%
Major export markets (1999)	
United States	100%

NOTES

Data Sources

The main sources for the data are Statistics Canada, Environment Canada, the Forest Products Association of Canada, Natural Resources Canada–Canadian Forest Service, the National Forestry Database and the Canadian Interagency Forest Fire Centre. Most of the information for the National Forestry Database was collected by provincial and territorial natural resource ministries. At the time of publication, data were preliminary. As data are finalized, they will be made available on the Internet in the National Forestry Database (http://nfdp.ccfm.org).

Forest Land

The data regarding Canada's forest land are based on Canada's Forest Inventory 1991 (revised 1994). The map on page 14 shows the forest land boundary.

Forest Resource

Ownership data are provided for the total forest land.

[a] Annual allowable cut: The level of harvest set by the provinces and territories for a year is called the "annual allowable cut" (AAC). AAC figures include data for both softwoods and hardwoods. The AAC figures for Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Manitoba include federal, provincial and private lands. Given the differences outlined below, a national AAC cannot be calculated by simply adding the provincial and territorial AACs.

- The national AAC figure that appears on page 14 was arrived at by estimating some data for private and federal lands, and converting the Ontario area figures into volume figures.
- Ontario provides figures for AAC (which it refers to as the "maximum allowable depletion") in hectares only.
- Alberta and Ontario do not include figures for private lands in their AACs.
- Saskatchewan's figures include federal land only.
- British Columbia does not include all private lands in its AAC.

[b] Harvesting: The national and provincial figures for harvesting volume include data for industrial roundwood only. The harvest level for fuelwood or firewood for a single province may range as high as 2.2 million m^3, and is not included in these harvest figures.

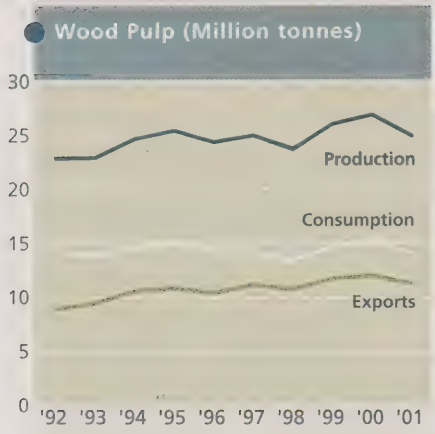
- Although the AAC for British Columbia does not include all private lands, these lands are included in the harvest figure. The yearly harvest rate for British Columbia may fluctuate, and in some cases, it may exceed the AAC. Over a five-year period, however, the harvest figure would be equal to or lower than the AAC.

[c] Status of harvested Crown land: These data reflect the cumulative area harvested since 1975. Except for Prince Edward Island, data for private lands are not included. The term "stocked" refers to land where the forest cover meets certain timber-production standards established by forest management agencies in each province and territory. The term "understocked" refers to harvested land that requires silviculture treatments, such as site preparation, planting, seeding or weeding, to meet established standards. This category also includes land that has not yet been surveyed. A significant proportion of recently harvested areas will always be reported as understocked because of the time lag between harvesting and observable results of subsequent treatments. The small percentage of the area harvested each year that is devoted to access roads is not included in these data.

[d] Insect defoliation: The data relating to insects were provided by provincial and territorial agencies, and they include moderate-to-severe defoliation only. Defoliation does not always imply mortality; for example, stands with moderate defoliation often recover and may not lose much growth. Also, defoliation is mapped on an insect species basis, and a given area may be afflicted by more than one insect at a time. This may result in double or triple counting in areas affected by more than one insect, exaggerating the extent of the total area defoliated.

[e] All "Area burned" figures are from the Canadian Interagency Forest Fire Centre. Area burned includes areas within National Parks.

FOREST STATISTICS*



Wood Pulp (2001)

In Canada, approximately two thirds of paper produced is destined for export markets. When Canadian paper exports decline, so does wood pulp consumption in Canada. This is what happened in 2001 when paper exports and wood pulp consumption decreased in comparison with the previous year's record level. These poor market conditions were not limited to Canada. Paper production also declined in the US, decreasing that country's need for wood pulp and adversely affecting Canadian exports. Because of the drop in domestic consumption and wood pulp exports, production decreased as well.

2001	Million tonnes	Annual change	
		1 year	10 years
Production	24.9	-7.3%	0.9%
Exports	11.2	-5.8%	2.4%
Consumption	14.0	-8.2%	-0.2%

Lumber (2001)

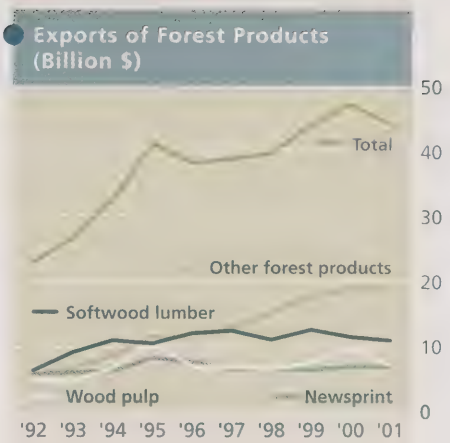
The Canada-US Softwood Lumber Agreement expired in March 2001, putting an end to five years of quotas on Canadian lumber exports to the US. The American industry immediately recommenced the commercial war it had begun twenty years before. In response to accusations by the American industry, the US Department of Commerce imposed countervailing and anti-dumping duties on softwood lumber imported from Canada. Canada has challenged the American decision both through the World Trade Organization and under the North American Free Trade Agreement. Despite these trade disputes, Canadian lumber exports to the US increased in 2001. Unfortunately, exports to other countries fell, resulting in a slight decrease in total exports (0.2%). Although it was a record year for housing development in Canada, there was a drop in domestic lumber consumption.

2001	Million cubic metres	Annual change	
		1 year	10 years
Production	69.9	-4.2%	2.3%
Exports	50.0	-0.2%	2.3%
Consumption	21.5	-13.3%	2.2%

*See "Data Sources" on page 21.

Exports of Forest Products (2001)

Although they decreased in comparison with the record year in 2000, forest product exports in 2001 totalled $44.1 billion. A worldwide drop in demand for wood pulp caused prices to plummet by nearly 25%. This led to pulp exports decreasing from $9.9 billion in 2000 to $7.2 billion in 2001. Softwood lumber and newsprint prices also fell, which affected export earnings, although to a lesser extent than wood pulp. Only exports in the "other forest products" category increased, confirming a long-standing trend. Ten years ago, forest products other than newsprint, wood pulp and softwood lumber represented 25% of total forest product exports; in 2001, they represented 43%. There is greater diversity in Canadian forest product exports, and the three forest products that have traditionally dominated the sector are making way for many new products.



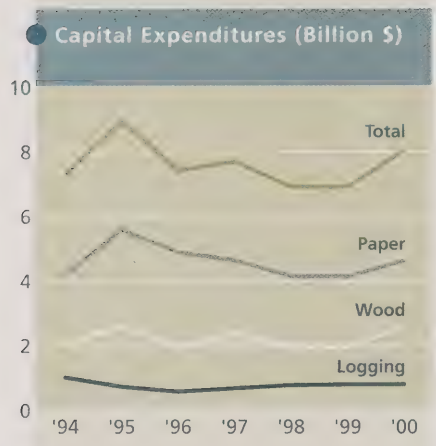
2001	Billion $	Annual change	
		1 year	10 years
Total	44.1	-6.9%	6.7%
Other forest products	19.0	0.2%	12.6%
Softwood lumber	11.0	-4.7%	5.6%
Wood pulp	7.2	-27.1%	3.6%
Newsprint	7.0	-1.2%	1.8%

Trade Balance (2001)

The trade balance is obtained by subtracting imports from exports. In 2001, the Canadian trade balance was more than $59.3 billion, meaning that exports greatly exceeded imports. This trade surplus was due in large part to forest products. Exports of forest products totalled $44.1 billion, while imports reached only $9.8 billion, for a trade balance of $34.3 billion for these products. Every province and territory had a trade surplus in the area of forest products. The provinces that made the most significant contributions to the surplus, however, were British Columbia and Quebec, with trade balances of $12.9 billion and $10.4 billion respectively; followed by Ontario, Alberta and New Brunswick, with $3.7 billion, $2.6 billion and $2.2 billion respectively.

2001	Billion $	Annual change	
		1 year	10 years
Trade balance	59.4	5.9%	14.9%
Forest products' contribution	34.4	8.4%	6.0%

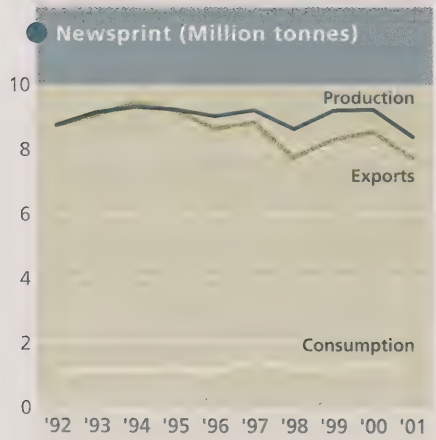
Capital Expenditures (2000)



Capital expenditures can be divided into two major categories: new capital investments and repairs. New capital investments enable the industry to increase its production capacity, while repairs keep the existing capacity operational. For the entire forest industry, annual repairs normally range between $3.2 billion and $3.5 billion, while new capital investments total $4 billion on average, but fluctuate more than repairs. In 2000, new capital investments reached $4.5 billion thanks to an outstanding year for the wood industry. Repairs amounted to $3.5 billion, for a total of $8 billion in capital expenditures in the forest industry.

2000	Billion $	Annual change	
		1 year	5 years
Total	8.0	19.9%	1.6%
Wood product manufacturing	2.6	33.0%	5.9%
Paper manufacturing	4.6	17.3%	-1.1%
Logging	0.8	1.0%	6.9%

Newsprint (2001)

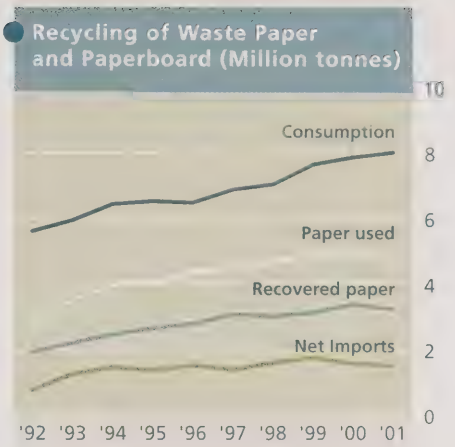


Nearly 92% of newsprint produced in Canada is destined for export markets, and Canada is the world's leading newsprint producer. In 2001, American and Canadian demand for newsprint declined and overseas exports decreased, with an immediate effect on our newsprint production. Demand for newsprint has been stagnant for a number of years, while demand for uncoated groundwood paper, which is used to produce such items as advertising inserts in newspapers, is rising sharply. Canadian producers have adapted by modifying certain paper machines to produce uncoated groundwood paper instead of newsprint. Today, nearly half the uncoated groundwood paper manufactured in North America is made in Canada.

2001	Million tonnes	Annual change	
		1 year	10 years
Production	8.3	-9.2%	-0.4%
Exports	7.7	-9.7%	-1.2%
Consumption	1.2	-3.2%	1.4%

Recycling of Waste Paper and Paperboard (2001)

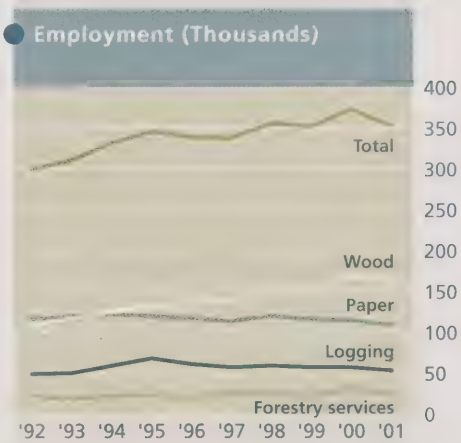
For the first time in at least ten years, Canadian paper manufacturers have decreased their use of recycled fibre (by 4.4%). However, they have decreased even further their use of wood pulp (8.2%). It can therefore be said that despite decreased use of recycled paper, recycled fibre content in Canada increased in 2001. In 2000, for every tonne of wood pulp used, Canadian paper manufacturers used 330 kg of waste paper; in 2001, they used 343 kg. The drop in the use of recycled paper is the result of decreased paper production, and not decreased recycling.



2001	Million tonnes	Annual change	
		1 year	10 years
Consumption of paper and paperboard	8.1	1.8%	4.3%
Recovery of waste paper	3.3	-4.5%	6.6%
Use of waste paper	4.8	-4.4%	7.4%
Net import of waste paper	1.5	-4.2%	9.4%

Employment (2001)

Approximately 20 000 jobs were lost in the forest sector between 2000 and 2001, which is almost equal to the number of jobs gained between 1999 and 2000. The number of jobs in 2001 therefore decreased to what it was in 1999. Every sector lost jobs; however, the pulp and paper sector lost the most, followed closely by logging and forest services. The wood industry had the best performance, with only 3 000 jobs lost.



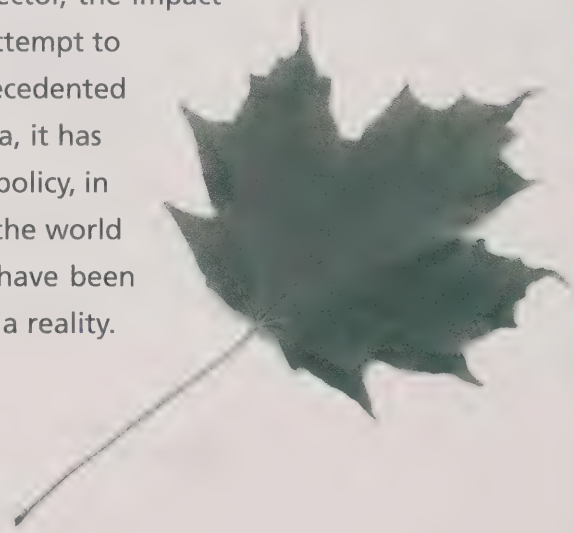
2001	Person-years	Annual change	
		1 year	10 years
Total	352 800	-5.5%	1.6%
Wood product manufacturing	164 300	-2.0%	4.1%
Paper manufacturing	110 500	-5.1%	-1.0%
Logging	54 600	-7.8%	1.0%
Forestry services	24 300	-22.0%	1.0%

Feature Article

CANADA'S FORESTS
TEN YEARS OF EVOLUTION

In the eyes of many, 1992 marked a turning point for the world's forests. In June of that year, representatives from 178 countries—nearly every nation in the world—assembled in Rio de Janeiro, Brazil for the United Nations Conference on Environment and Development (UNCED). This conference was the culmination of two years of extensive international dialogue on sustainable development.

The agreements reached at Rio have immeasurably influenced how the world's natural resources are managed. For the forest sector, the impact has been tremendous. UNCED was the first real global attempt to deal with forest issues, and it sparked a decade of unprecedented international cooperation on the subject. Here in Canada, it has been a decade of advancement for the forest sector—in policy, in planning and in practice. At Rio, Canada announced to the world its commitment to sustainable forestry. Since then, we have been proving to the world that this commitment can become a reality.



1992: THE WORLD COMES TO RIO

UNCED, or the Rio Earth Summit, took place at a time of intense global interest in forests. In fact, many of the Summit's activities and subsequent conventions arose out of concern for the world's forests. Even though world leaders reached agreement on an international framework of sustainable forest management, UNCED countries were still strongly divided on many forest issues, largely because of the differing priorities of developing and industrialized nations.

Canada took a strong lead at Rio, especially in discussions on sustainable forestry. This was largely because of our progress on forests at home. Several months before the Summit, Canada had introduced a new National Forest Strategy, making it the first country to commit to sustainable forestry at a national level. Canada thus became an important model for other nations at the Summit.

One of Canada's UNCED priorities was to have nations agree on an accepted definition and measurement of sustainable forest development. Canada took the position that scientifically based, international criteria would level the field in the forest products market, as well as encourage more sustainable forest management. But our hope that such criteria would form part of a legally binding forest convention went unfulfilled. Nonetheless, the Summit paved the way for the widespread development of criteria and indicators that ensued.

In addition to producing a number of important agreements and conventions, the Summit gave rise to various fora for continuing the international dialogue on forests. They in turn led to an intergovernmental agreement on guidelines for national forest programs, as well as to detailed proposals for action. Today the United Nations Forum on Forests (UNFF) carries on this work, with the added task of monitoring, assessing and reporting on progress. The UNFF is joined by many other international groups in working toward sustainable forestry—the World Commission on Forests and Sustainable Development, the Collaborative Partnership on Forests and the G8 Action Programme on Forests, to name a few.

Without a doubt, the Rio Earth Summit ushered in a new era of international cooperation on forests. Today, there is widespread agreement that forest issues are global and there is greater recognition of their many benefits and services. Yet there is also broad agreement that to maintain these benefits and services, individual nations must implement sound forest programs. Sustainable forestry benefits the world, but it must start at home.

"Since Rio...there has been a greater realisation of our common responsibility towards the world's forests. .. There is today an increasing consensus among both developed and developing countries on the scope and scale of a large number of forest-related issues."

Jagmohan Maini
Coordinator and Head, Secretariat of the United Nations Forum on Forests

1992–2002: A DECADE OF CHANGE

For the world's forests, a crucial document to emerge from UNCED was the Non–Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests ("UNCED Forest Principles"). In establishing these principles, the countries represented at UNCED committed themselves to sound management of the world's forests.

Though not legally binding, the Forest Principles nonetheless provide an international framework for sustainable forest management. Since Rio, this framework has guided countries in developing national forest programs, adopting criteria and indicators for forest management, acknowledging forests' multiple benefits, and taking other measures to ensure that forests continue to provide the goods, services and benefits on which the world relies.

The guiding objective of the Forest Principles, as stated in the document's preamble, is "to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses." The 15 principles (and subprinciples) all support this objective. They address the different yet complementary dimensions of forests—environmental, social and economic—and articulate how countries should balance these dimensions in managing and using forest resources.

The UNCED Forest Principles have steered Canada, as well as other forest nations, through a decade of change. Since the Rio Summit, forest policies and practices in Canada have evolved to keep pace with our broadening concerns and our changing expectations. The following overview shows how this evolution is consistent with some of the Forest Principles most applicable to Canada.

Developing National Policy

UNCED Forest Principle 2a

States have the...right to utilize, manage and develop their forests in accordance with their development needs...and on the basis of national policies consistent with sustainable development...

Well before UNCED tied forest use to sustainable national policies, Canada had begun drafting its own blueprint for sound forestry. In the 1980s, Canada developed two national strategies to help guide the forest community's actions. In 1990, largely in response to the call for sustainable development from the influential Brundtland report, Canada embarked on a far more extensive and consultative process.

In that year, the ministers responsible for forests at the federal, provincial and territorial level began to seek out nationwide consensus on how Canada's forests should be managed. What ensued was the widest public discussion of forests in Canadian history, involving governments, wildlife groups, industry, First Nations, professional foresters, private woodlot owners, academics and many others. Finally, in March 1992, Canadians unveiled their new "National Forest Strategy, Sustainable Forests: A Canadian Commitment". As well, the first-ever Canada Forest Accord was signed by 29 government

NATIONAL FOREST STRATEGY

Canada has reason to be proud of its National Forest Strategy. The Strategy has guided the forest community in the pursuit of sustainable forestry, leading to new forest legislation and policies, renewed national programs, local and regional strategies, and tools and practices for sustainable forest management. Examples of its influence include:

- The National Forest Strategy emphasizes multiple benefits. Some provinces and territories have included management for multiple benefits in their forest legislation, recognizing the social and economic benefits that flow from the forest's diversity.
- Another National Forest Strategy priority is sound stewardship. Canada reconfirmed its commitment to biodiversity, and to protecting fragile ecosystems, watersheds and fresh water resources, by releasing a renewed Canadian Biodiversity Strategy in 1998.
- The National Forest Strategy emphasizes the importance of reporting on forest sustainability. In 1995 Canada implemented a criteria and indicators (C&I) framework, consisting of 6 criteria and 83 indicators for measuring sustainable forest management. Canada released its first technical report on C&I in 1997, followed by a national status report in August 2000.

and non-government forest representatives. Five years later, the National Forest Strategy was updated (1998–2003), and the second Canada Forest Accord was endorsed by 52 stakeholders.

Canada's National Forest Strategy is a collective attempt to reconcile diverse expectations for forests, their managers and users. It provides a collective vision and goals to which all aspire. Those expectations are embodied in the document's nine strategic directions, many of which reflect the UNCED Forest Principles: forest ecosystems, sound stewardship, public participation, science and technology, forest communities and Aboriginal people. Creating the National Forest Strategy has been an exercise in consolidating expectations and building consensus—no small feat in a country in which the forest spans many regions and policy is heavily decentralized, with 71 percent of forest land under provincial jurisdiction.

Echoing the spirit of UNCED, which emphasized that forests are a shared responsibility, Canada's National Forest Strategy is voluntary, not regulatory; it places the onus for sound management squarely on the forest community's shoulders. The strategy outlines objectives set by the Canada Forest Accord signatories, but it is up to individual organizations to decide how to meet them. The strategy also aims for transparency. An independent panel evaluates its implementation at the mid-term and at the end, and then reports to the Canadian public.

The National Forest Strategy has been influential internationally as well as domestically. With the 1992 strategy, Canada became the first country in the world to commit to sustainable forest management on a national level. This accomplishment assured Canada a prominent role at Rio and in subsequent international forest fora. As well, our strategy has served as a template for other countries in designing their own national forest policies. In early 2003, Canadians will be giving themselves a newer and more strategic fifth National Forest Strategy, developed once again, by way of extensive public consultation across Canada.

More information on Canada's National Forest Strategy can be accessed at the following Internet website: http://nfsc.forest.ca.

Managing Multiple Forest Benefits

UNCED Forest Principle 2b

Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products...

Canada has been directing its efforts toward sustainable yield for decades. By the end of the 20th century, the terms "multiple benefits" and "multiple values" had become inseparable from forest issues in Canada. The idea that forests offer an array of benefits—environmental and commercial, cultural and spiritual—gained currency throughout the forest community and was a key message at Rio. Over the past decade, forest policies across Canada have changed to incorporate multiple benefits directly into forest management.

The most significant policy changes have occurred at the provincial level. This is not surprising given that the provinces have regulatory responsibility over most of Canada's forests. In the past ten years, provinces have amended their legislation to ensure that forests are managed more holistically, in a way that recognizes multiple benefits and reflects Canadians' diverse forest goals.

For instance, provincial legislation now designates more Crown forest land for non-commercial use, protects biodiversity and involves the public in forest decision making. Provincial legislation and policies also set the boundaries within which the forest industry can operate. The provinces, in granting Crown timber leases, set stringent planning and operational guidelines for companies. Increasingly, these leases require companies to tend and regenerate forests to meet objectives that extend well beyond the commercial to encompass forest and ecosystem health, wildlife and habitat protection, traditional and indigenous forest use, recreation and aesthetics.

Amended provincial policies have laid a strong foundation for forest management that balances the needs of all citizens. But how do we know when that balance is being achieved? One approach is to define, measure and report on scientifically based indicators of forest sustainability. This is the objective of the Canadian Council of Forest Ministers' criteria and indicators (CCFM C&I) framework. By tracking Canada's performance at the national level using the 83 indicators under the 6 criteria for sustainable forest management, forest managers can evaluate progress, shape policy, and focus forest research. The 6 criteria are: conserving biodiversity, maintaining and enhancing forest ecosystems, conserving soil and water, contributing to global ecological cycles, providing multiple benefits, and accepting society's responsibility for sustainable development.

MANAGING FORESTS FOR MULTIPLE VALUES

New Brunswick firmly established multiple benefits as part of Crown forest management in December 1999, with the release of a new vision document. Revised in March 2000, the document underscores the forest's many values, outlining policy goals in six areas: public values, forest ecosystems, wildlife habitat, timber, water and recreation, and aesthetics. It also lists specific strategies for realizing these goals, including:

- providing for recreation
- consulting the public on forest objectives
- protecting unique sites
- ensuring the full range of natural forest types and successional stages
- safeguarding habitat of endangered species
- using efficient and sensitive harvesting techniques
- protecting water quality through buffer zones and proper construction of roads and bridges
- improving aesthetics along recreational waterways and highways

Prince Edward Island also made multiple benefits a priority when it established the province-wide Public Forest Council in 2001 to encourage innovative non-timber uses of Crown forest land. The Council, which favours community-led initiatives, has been hosting meetings around the Island to gather residents' ideas for non-consumptive, non-traditional uses of the forest. Possibilities include recreation, ecotourism and the harvesting/gathering of fruits, berries, mushrooms, greens and medicinal plants. The Council hopes its work will lead to new economic opportunities for P.E.I. residents and new ways of benefitting from public forests.

In recent years, several provinces have developed their own criteria and indicators to reflect local conditions and values. For instance, the provinces of Quebec and Ontario have incorporated C&I directly into their forest legislation and policies, a process other provinces are considering or currently implementing.

Encouraging Public Participation

UNCED Forest Principle 2d

Governments should...provide opportunities for the participation of interested parties, including local communities and indigenous people, industries, labour, non-governmental organizations and individuals, forest dwellers and women, in the development, implementation and planning of national forest policies.

In Canada, where 94 percent of the forest is publicly owned, it is only fitting that citizens should have a direct say in how it is managed. Public involvement in forest policy was championed at Rio and has figured prominently in Canada ever since. Today, throughout the country, there is broad consultation with non-governmental organizations, industry, Aboriginal and local communities, academics and others before major forest decisions are made.

Participation and collaboration starts at the top. The Canadian Council of Forest Ministers, composed of federal, provincial and territorial forest ministers, stimulates the development of policies and initiatives in the forest sector. It sets the overall direction for the stewardship and sustainable management of Canada's forests.

At the international level, the federal government consults forest stakeholders as a matter of course before negotiating on Canada's behalf, often revising its positions accordingly. Similarly, Canada regularly includes non-governmental representatives in its delegations to international forest meetings and fora.

At the national level, public input has shaped many forest-related policies, including the National Forest Strategy, the Canadian Biodiversity Strategy, and the Criteria and Indicators for Sustainable Forest Management. The public will continue to be involved in reevaluating and refining forest policy frameworks as forest values and knowledge change.

At the provincial level, public participation has become a key component of provincial forest policy. For instance, to comply with its amended Forest Act, Quebec released a detailed consultation policy in late 2001 which outlines how citizens will be involved in forest decision making. The new Forest Act was itself the product of province-wide consultations that yielded over 600 briefs and attracted representatives from numerous interest groups and communities. British Columbia's Forest Practices Code, which governs all aspects of the province's public forest management, is reviewed regularly by the public and forest interest groups. Their feedback is currently helping the B.C. government draft a new results-based Forest Practices Code for implementation in spring 2003.

The provinces regulate commercial operations in provincial Crown forests, and here too public input has become formalized. Some provinces, such as British Columbia, Saskatchewan, Quebec and New Brunswick, require in their legislation and tenure agreements that companies involve the public in forest planning. Even in provinces where public input is not required by law, or in private forests, which are not regulated by most provinces, most forest companies do consult the public. Over the past decade, industry has come to recognize public involvement as an important ingredient in balancing commercial and non-commercial interests.

NRTEE: BRINGING THE PUBLIC TO THE TABLE

Explaining and promoting sustainable development to Canadians has been the raison d'être of the National Round Table on the Environment and the Economy (NRTEE) since its beginnings in 1988 as a special project under Environment Canada.

Now an independent federal agency, the NRTEE is an advisory group of individuals from many backgrounds, including business, labour, academia, environment and First Nations. Working with Canadians from coast to coast, the NRTEE identifies issues with environmental and economic impacts; assesses the issues, allowing interested parties to debate and express their views freely; and recommends solutions that balance economic and environmental considerations. Thanks to the NRTEE, Canadians have an impartial and inclusive forum in which to air their views on sustainable development.

Even though the forest is just one of NRTEE's many study areas, in the past decade, forests have been greatly influenced by the group's work over the last decade. In its round tables and reports on such topics as forest harvesting methods and private woodlot management in the Maritimes, the NRTEE has gathered the views of forest stakeholders nationwide. It has also provided advice and recommendations that reconcile competing views and respect the dual objectives of economic prosperity and environmental preservation.

The NRTEE, a signatory to the Canada Forest Accord, will continue to study how forests fit into the sustainable development equation. As one example, the group's Conservation of Natural Heritage program is looking at innovative ways of protecting the environment while preserving local communities' reliance—economic and otherwise—on resources from that environment. Case studies are underway across the country, with forests and forest communities as an important component.

Balancing Goals Through Collaboration

UNCED Forest Principle 3c

All aspects of environmental protection and social and economic development as they relate to forests and forest lands should be integrated and comprehensive.

Underlying most of the UNCED Forest Principles is a common theme: balance. In the late 20th century, "balance" emerged as the watchword for forestry throughout much of the developed world. During this period, bringing different values into equilibrium became central to forest management in Canada. This has been even more so since Rio, where the world's nations committed to sound and balanced natural resource development.

In Canada, seeking balance in the forest sector has meant many things. It has meant distilling the needs and values of many into revised forest policies. It has meant managing forests so they continue to provide an array of benefits, commercial and non-commercial. It has meant considering the views of forest users and the public in making policies and decisions.

Progress on all these fronts has been possible largely because of a shift in how we address forest issues. A decade ago, forests were the subject of bitter dispute, with battle lines drawn more or less between consumers and preservers of forest resources. Indeed, in 1992 forest issues were among the most contentious dealt with at UNCED. Since then, however, the lines have softened. In Canada, the forest community is now characterized more by collaboration than by confrontation. Forest accords are the norm. Partnerships abound. Stakeholders who once protested one another's activities now work together. Canadians have learned that all forest goals are interrelated, and that the only solutions that benefit the forest are shared solutions.

An example of innovative collaboration is Canada's Model Forest Program. There are 11 working model forests across Canada, each run by a broad partnership that may include forest companies, national parks, governments, woodlot owners, Aboriginal people, academic institutions, environmental groups and labour. The partnerships allow different interest groups to reach consensus on sustainable forest management and to address any conflicts or trade-offs early in the planning stage.

Each model forest is managed for a variety of values, ranging from sustainable timber supply to water quality, from wildlife habitat to ecotourism and spiritual values. While they all share the objective of sustainable forestry, each model forest is distinct, with a different history, ecosystem, population base and activities. The Model Forest Program has made great strides in adopting and promoting sustainable forest management and practices.

COLLABORATING ON CONSERVATION IN NOVA SCOTIA

In an innovative alliance forged in November 2000, the Nova Scotia Department of Natural Resources is pooling resources with the Nature Conservancy of Canada, a charitable conservation group, to protect up to $1 million worth of land in the province. Under the terms of the partnership, the Nature Conservancy has pledged to raise at least two dollars for every dollar the province contributes. The Campaign for Conservation, as the partnership is known, is especially intent on conserving coastal wetland systems, one of the most endangered types of ecosystems in the world.

Since the partnership began, several unique sites have been preserved. One is Prospect High Head, a relatively undisturbed area on Nova Scotia's southern coast, between Halifax Harbour and Peggy's Cove. The land, which the province donated to the Nature Conservancy, is one of only two ecological areas in the province classified as "Granite Barrens." With its small bogs, crowberry barrens, glacial erratics and granite outcrops, Prospect High Head provides a migratory stopover and a nesting, feeding and wintering ground for many bird species, including the rare whimbrel and the endangered harlequin duck. As well, the barren's ecosystem purifies vast quantities of groundwater as it flows into the ocean.

Another recent acquisition is Gaff Point, a 50-hectare coastal area of mixed forest, heath, grassland and beach 20 kilometres south of Lunenburg. The Nature Conservancy spent nearly two years negotiating with the numerous private owners (many of them offshore) of this rugged headland. Also, protected status has been granted to two of the three forested Martinique Islands in Musquodoboit Harbour, designated as significant wetlands under the Ramsar Convention. Work is underway to acquire the third.

Conserving ecologically significant land is just the first step for the Campaign for Conservation. The partners will also work together to produce long-term stewardship plans for the secured properties and to promote ecotourism where appropriate.

For instance, model forests have developed and used Geographic Information Systems (GIS) technologies for forest management and resource planning. They have conducted leading-edge wildlife research and experimented with alternative silviculture. They have developed local indicators of sustainable forest management, innovative land tenure models, and codes of conduct for woodlot managers and contractors.

Additional information on Canada's Model Forest Program is available at the following website address: http://www.modelforest.net.

Maintaining Ecosystems

UNCED Forest Principle 4

The vital role of all types of forests in maintaining the ecological processes and balance...through...their role in protecting fragile ecosystems, watersheds and freshwater resources and as rich storehouses of biodiversity and biological resources...should be recognized.

The UNCED Forest Principles articulated the fact that forests cannot be isolated from the complex ecosystems to which they belong. Sound forest management means sound ecosystem management—preserving the forest's ability to support a variety of plant and animal life, to regulate soil and water quality and to contribute to such ecological systems as carbon cycling.

At Rio, world leaders formally endorsed the importance of ecosystem integrity by signing the Convention on Biological Diversity. This legally binding agreement has three main objectives: (1) conservation of biological diversity, (2) sustainable use of biological resources and (3) equitable sharing of benefits arising from genetic resource use. Canada was the first industrialized country to ratify the Convention, and is home to its secretariat.

The Convention on Biological Diversity required Canada, along with other countries, to develop its own strategy for meeting the Convention commitments. Consequently, in 1995, the Canadian Biodiversity Strategy was adopted by the provincial, territorial and federal governments as a blueprint for complying with the Convention and other international biodiversity agreements. The Canadian strategy acknowledges that these governments share responsibility for biodiversity, and emphasizes that cooperation is essential for creating the right policy, management and research conditions to advance ecological management.

In 2000-2001, Canada demonstrated leadership in furthering the conservation and sustainable use of the world's forest biodiversity when it co-sponsored and co-chaired a process that proposed an expanded program of work on forest biodiversity. The proposal was deliberated and adopted in 2002 at the Sixth Conference of the Parties to the Convention on Biological Diversity. Canada's forest community is now poised to identify the priority elements of this new program of work and integrate them into its future action plans for achieving the objectives of the Canadian Biodiversity and National Forest Strategies and related action plans, programs and policies.

Naturally, Canada's biodiversity commitments have many implications for the forest sector. More than ever, forest managers and operators are weighing how activities such as harvesting, reforesting and road building affect ecological balance. Accounting for biodiversity has influenced almost every aspect of the forest industry, from logging methods to machinery, from forest planning to silviculture.

ECOSYSTEM MANAGEMENT AT THE LOWER SEYMOUR CONSERVATION RESERVE

Minutes from downtown Vancouver, the Lower Seymour Conservation Reserve, with its forested slopes, alpine meadows and river flood plains, features some of the most breathtaking scenery the region has to offer. More than just a haven for nature lovers and outdoor recreationists, this 5 668-hectare site is primarily a water reserve, supplying about 40 percent of Greater Vancouver's drinking water. The water supply and treatment facilities will expand over the next decade to accommodate the region's growing population.

The Lower Seymour Conservation Reserve was part of the district's closed watershed lands until 1987, when it was opened to the public as the Seymour Demonstration Forest. The site was renamed in 1999 to better capture its many uses. These include (in addition to water supply) public education and recreation; habitat for numerous animal, bird, fish and plant species; and program research for such educational facilities as the B.C. Institute of Technology.

The reserve is forested with a mixture of old-growth and second-growth stands. The valley bottom, which was logged during the last century, is now covered extensively with second-growth stands, some in the 80- to 90-year-old range, and some younger at 20 to 30 years of age. The higher elevations are covered with old-growth forest, as is much of the riparian area, which features some of the few remaining Sitka spruce in B.C.'s lower mainland.

Sound ecological management of the reserve is critical given the area's importance to the Vancouver water supply. To improve the Seymour River's fish stocks and fish habitat, which dwindled after the watershed dam was built, the Seymour Salmonid Society runs a fish hatchery in the reserve. For the forested areas, which provide critical habitat for the endangered spotted owl among other species, the chief goal is to minimize disturbance. To that end, the reserve has established fire management and erosion control programs.

In 2000, the Lower Seymour Conservation Reserve began a series of public consultations and technical studies to come up with a strategy for the area's overall sustainability. The new management plan will safeguard the water reserve, continue with wildlife and forest research and demonstration, increase the site's recreational potential, and create a new approach to land stewardship that will keep the reserve healthy well into the future.

Awareness of how wooded areas can prevent erosion and enhance soil quality has led to changes as well. Some farmers, realizing that trees can further their agricultural objectives instead of hampering them, are reevaluating the traditional practice of wholesale clearing. The forest's role in water quality is also emerging as a critical issue, globally as well as domestically, and is the subject of various research projects across the country. The relationship between forests and water is particularly relevant in Canada, home to some 10 percent of the world's forests and 20 percent of the world's fresh water.

Integrating Aboriginal Perspectives

UNCED Forest Principle 5a

National forest policies should recognize and duly support the identity, culture and the rights of indigenous people, their communities and other communities and forest dwellers. Appropriate conditions should be promoted for these groups to enable them to have an economic stake in forest use, perform economic activities, and achieve and maintain cultural identity and social organization...

Aboriginal people's relationship with the forest has spanned thousands of years. It has shaped their identity, culture and spiritual beliefs, and has generated a large body of traditional forest knowledge. Today, that relationship remains strong. In Canada, about 80 percent of aboriginal communities are in forested regions, and some 1.4 million hectares of forest land are located within reserves.

World leaders at Rio took important steps to recognize the link between sustainable development and the knowledge and practices of native peoples. In 1992, fewer than one percent of Aboriginal post-secondary students were enrolled in natural resource management programs in Canada. Aboriginal forest technicians were scarce, and registered Aboriginal professional foresters even scarcer. Furthermore, educational programs lacked Aboriginal input into curriculum development. As a result, the federal government pledged to increase Aboriginal participation, training and employment in forestry. It introduced the Pathways to Success Strategy, which earmarked $200 million a year for Aboriginal training, including forestry. Meanwhile, post-secondary institutions began tailoring their forest management programs to Aboriginal students and including traditional knowledge and values in their curricula.

In 1996, Canada went a step further, launching the First Nation Forestry Program (FNFP). The program offers First Nations new opportunities to develop their forestry skills and knowledge through forest management training, planning, and silviculture. Since its inception, the program has supported some 1 150 projects valued at over $79 million—$25 million from the program itself, $54 million from First Nations and their partners. Numerous forest-related companies have been created and approximately 4 800 First Nations forest workers have received on-the-job training.

ABORIGINAL HERITAGE GARDENS

In August 2002, New Brunswick's Eel River Bar First Nation will unveil a forest program and interpretation centre designed to showcase ecological knowledge developed over the ages. The Aboriginal Heritage Gardens will demonstrate how indigenous and exotic forest plants are used for medicine, food, crafts and other cultural purposes by the Mi'kmaq people. The gardens will teach the general public about traditional ecological practices, while at the same time reacquainting First Nations members with their heritage.

Located at the mouth of the Eel River, adjacent to Chaleur Park in northeastern New Brunswick, the Aboriginal Heritage Gardens' 45 hectares feature some 380 vascular plants, 16 percent of which are exotic species. One of the most dominant exotics on the site is black knapweed *(Centaurea nigra)*. Visitors entering the gardens will be able to choose from five different trails through undisturbed mixed woodlands, with lush groundcover of herbs and ferns, or through old cedar groves, marshes, meadows and regenerating fields covered with indigenous and exotic species. The interpretation centre will offer visual, tactile, interactive and multimedia experiences to educate visitors about native plant use.

Developing the gardens meant blending tradition and technology. For years, the Eel River Bar First Nation worked on documenting its traditional forestry approaches, carefully researching and gathering information from elders. Then First Nations members used GIS systems to help map the site. In 1995 a master plan for the gardens was developed, modelled on the Smithsonian Institution's North American Indian Heritage Garden. To cultivate the gardens, staff first worked to control the spread of troublesome invasive plants, then sowed plots of sweet grass and other traditional plants.

The Aboriginal Heritage Gardens represent real innovation by the Eel River Bar First Nation. By teaching society about Mi'kmaq heritage, and by documenting a wealth of lessons learned from nature, the gardens will be a celebration of, and a tribute to, traditional ecological knowledge and is expected to be a leading Aboriginal tourist attraction in Atlantic Canada.

In addition to the FNFP, Canada has launched a pilot project designed to increase the forestry involvement of other Aboriginal people. In 2000-2001, the federal government supported a number of Métis forest projects, including a joint venture between five Métis communities and a wood business in Saskatchewan, an outfitters demonstration project in Quebec, and training programs for youth and sawmill workers in Saskatchewan.

Aboriginal people are managing partners in a number of Canada's model forests, and lead the management of the Waswanipi Cree Model Forest in Quebec's James Bay area. Together with the forest industry, government and other groups involved in the model forest, the Crees are working on new forest management methods that combine current practices with traditional Cree knowledge. They are also creating a certification program to recognize those who respect the Cree system of land management. Recently the model forest partners began a consultation project to explore ways of enhancing Cree participation in forest management planning.

Canada's Aboriginal people are also starting up innovative businesses that go beyond mainstream forest activities—ecotourism destinations, heritage parks, and cultural villages are just a few examples. Other Aboriginal projects are focusing on non-timber forest products and benefits. The "ethno-botany" project in interior British Columbia has been studying the Ktunaxa and Kinbasket communities' traditional use of native plants for medicinal and other cultural purposes. One of the federal government's Métis and off-reserve projects, conducted with the Ontario Native Women's Association, studied the market for non-timber forest products.

More Aboriginal involvement in the forest sector has meant more input into forest decision making. From coast to coast, Aboriginal people are helping shape legislation and policy, expanding protected areas, managing model forests and influencing forest practices. Since 1991, the non-profit National Aboriginal Forestry Association (NAFA) has been a strong national voice for Aboriginal Canadians in forest matters. A signatory to the Canada Forest Accord, NAFA is dedicated to increasing Aboriginal control in forest management and involvement in commercial opportunities. NAFA is committed to multiple-use forestry to ensure that the forest continues to meet the varied needs of Aboriginal communities.

New Directions for Wood Production

UNCED Forest Principle 6b

National policies and programmes should take into account the relationship, where it exists, between the conservation, management and sustainable development of forests and all aspects related to production, consumption, recycling and/or final disposal of forest products.

Forest products are, and always have been, a mainstay of the Canadian economy. They comprise the largest contributor to the country's net trade balance and a major employer across the country. The forest sector influences the standard of living of all Canadians, and is critical to the hundreds of communities that directly depend on it. Canada is also a global leader in forest exports, producing about 25 percent of the world's newsprint, 16 percent of its market pulp and 21 percent of its softwood lumber.

The preamble to the UNCED Forest Principles makes it clear that forests play a vital economic role: "Forests are essential to economic development and the maintenance of all forms of life." This statement not only highlights the forest economy, it balances economic considerations with biodiversity and the environment. The need for balance has steered the Canadian forest industry over the past decade to adapt to the changing priorities, policies and practices associated with sustainable forest management. For Canadian forest companies, this has meant changes to where they can harvest, changes to the kind of timber they can take and changes to how they manage and use the forest resource. In particular, companies have had to revisit two considerations.

The first involves products and processes. Historically, the Canadian industry has been heavily oriented toward commodities, including newsprint, market pulp and softwood lumber. It has also relied on an abundant, high-quality, inexpensive wood supply for its competitive advantage. Now, costs (many associated with sustainable management requirements) are on the rise, and in some regions, the area available for harvesting is shrinking (partly due to the protection of natural forests). As a result, many forest companies have been seeking more efficient ways of using the forest resource.

For some, this has meant innovation to derive more value from available fibre—engineered wood products, composite wood-based panels, value-added papers. For others, it has meant recycling and salvaging—paper products that use residues and recovered paper rather than virgin fibre, alternative fuels from bark and other by-products. For still others, it has meant developing processes and tools that make greater use of available wood—saw blades with thinner kerf, which produce less sawdust, and processing traditionally unusable small-diameter trees for veneer.

The second consideration involves the source of wood supply. Over the past decade, the industry witnessed shifts in the availability of commercial forest—shifts that will no doubt continue as more areas are protected and more Aboriginal land claims resolved. Many in the industry, faced with growing global demand for wood and uncertain local supply, are considering intensive management for sustainable timber supply. Canada has little experience with intensive forest management, but in recent years some companies have been taking a more aggressive approach. This includes starting plantations of fast-growing species, investigating ways of cutting rotation time and improving yield, and experimenting with genetic breeding to enhance desirable characteristics. The Canadian Council of Forest Ministers, through an initiative entitled Forest 2020, is currently looking at intensive

FOREST PLANTATIONS: TAKING ROOT IN CANADA

Around the world, plantation forestry is an idea whose time has come. Plantations are now major sources of fibre in many countries, including New Zealand, Japan and Brazil, and are especially common in Europe. In fact, many countries are expanding their plantations in anticipation of a global increase in wood demand.

In Canada, however, where natural forests blanket the terrain, tree plantations are still rare. Only in recent years, in response to society's interest in protecting more natural forest and managing it for non-timber purposes, has the forest sector begun exploring the idea in any depth. Even so, the concept is in its earliest stages in this country. Canada is well behind other nations, including the United States, in making forest plantations part of the wood supply.

Alberta-Pacific Forest Industries has gone farther than many other Canadian companies in experimenting with tree farms. Located 200 kilometres northeast of Edmonton, Alberta-Pacific's kraft pulp mill is surrounded by 350 hectares of poplar farms. The company established its tree farming program to supplement timber from the natural forest. The plantations also serve as sites for research on tree improvement (some 42 varieties of trees are being grown) and on better forest management practices. Because the program is open to local landowners interested in poplar farming, it also provides a way for area farmers to diversify their agricultural income.

Domtar, anticipating a shortage of poplar near its Windsor, Quebec paper facility, introduced experimental plantations in that area in 1997. As part of their preliminary research, Domtar officials visited a number of forest plantations in Europe, Brazil, Chile and Japan to learn how to manage plantations without diminishing biodiversity. Currently Domtar has a number of small tree farms in the Windsor region. It plans to add another 600 hectares this year, an amount that will be progressively increased to 1 100 hectares. The company is expecting a 13- to 15-year rotation, and eventually hopes to supply 10 percent of its fibre from the plantations.

Domtar has also maintained a small-scale poplar plantation near its Cornwall paper mill for the past 20 years. Producing just one percent of the mill's fibre, this plantation is primarily a research and development site where the company can test new hybrids and site preparation methods. Nonetheless, the mill recognizes that if local supply were to shrink, the poplar plantation, with its rapid rotation, could quickly fill the gap.

management as one way of balancing future economic goals with forest stewardship and societal concerns.

The Canadian industry has also had to adapt to consumers' growing desire for environmentally friendly products. Many companies have responded by having their products certified as originating from sustainably managed forests. There are now three certification systems in Canada: the Canadian Standards Association, the Forest Stewardship Council, and the Sustainable Forestry Initiative. All require third-party audits of forest practices. To date, more than 18 million hectares (about 15 percent of Canada's managed forest) are certified under these systems. Another 106 million hectares are certified under the ISO 14001 environmental management system, often considered a step toward forest certification. The Forest Products Association of Canada announced earlier this year that member companies must now undergo third-party assessments of forest sustainability and that certification will be a condition of membership in the future.

Conserving and Protecting Forest Land

UNCED Forest Principle 8f

National policies and/or legislation aimed at management, conservation and sustainable development of forests should include the protection of ecologically viable representative or unique examples of forests, including primary/old-growth forests, cultural, spiritual, historical, religious and other unique and valued forests of national importance.

Setting aside land for parks and nature preserves is hardly a new idea. What is relatively new is the idea that countries should create networks of protected areas that represent important ecological systems and features. This notion, which first gained prominence with the 1987 Brundtland report, was reinforced in 1992 at UNCED as an integral part of sustainable development.

In late 1992, responding to the international call to action, Canada's ministers of parks, wildlife, environment and forests committed the federal, provincial and territorial governments to protect 12 percent of Canada's natural areas in parks or reserves by 2000. Many provinces quickly followed up by releasing their respective plans to expand protected areas.

Although Canada did not meet the 2000 deadline, the amount of protected land in this country has increased considerably since 1992. Parks agencies have extended their holdings by some 24 million hectares. Provincially, British Columbia stands out with 13 percent of its land set aside, and Nova Scotia with more than 8 percent of

PROTECTING FORESTS IN THE KITLOPE

In British Columbia, where majestic mountains and dramatic scenery abound, the Kitlope Valley is still something special. Situated 120 kilometres southeast of Kitimat, on B.C.'s central coast, the Kitlope is the world's largest intact coastal temperate rainforest. It is home to 800-year-old towering trees and an ecologically important watershed. It provides habitat for grizzlies, black bears and moose, for six species of Pacific salmon, for bald eagles and marbled murrelets. And it is the traditional and spiritual homeland for the Haisla Nation.

Before 1994, the Kitlope Valley was also part of Tree Farm Licence 41, which gave West Fraser Timber the right to harvest the area. But the Haisla, together with Ecotrust (a non-profit environmental organization) and other conservationists, lobbied the forest company and the B.C. government to preserve the Kitlope's traditional and ecological integrity. In 1994 West Fraser Timber voluntarily relinquished all cutting rights to the land. The company's action paved the way for the Kitlope's designation as a protected area later that year.

Now the Kitlope Heritage Conservancy, as the area is known, is jointly managed by the Haisla and the B.C. government under a cooperative agreement. The 321 120-hectare park is accessible only by boat and is a favourite with wilderness campers. Besides its diverse natural features, which range from the riparian areas around the Kitlope River to alpine meadows, waterfalls and granite cliffs, the park offers glimpses of a long-past time. Visitors can see pictographs, the remains of old villages, and still-living cedars from which the Haisla harvested bark and planks.

Cooperation in the Kitlope has ensured that the ecological, historical and cultural richness of this site will be preserved for generations to come.

its land base now preserved, equivalent to about 20 percent of the province's Crown land. Ontario's 1999 Living Legacy brought an additional 2.4 million hectares of land under protection, increasing the province's parks and protected areas by one third. Overall, the total amount of protected land in Canada is roughly equivalent to the landmass of Germany and France combined.

For Canada, there are still some hurdles to clear in completing the protected area network. Among them are the absence of nationwide principles for conservation planning, the lack of a national mechanism for collecting data on protected areas, the varying categories of protected areas across jurisdictions, and uncertainty about what constitutes a "representative" area.

According to a 1999 study by the World Wildlife Fund, about 8.4 percent of Canada's forest land is now protected. In addition, another 19 percent of productive forest is under "policy constraint," meaning it is set aside from

harvesting because of policy or legislative guidelines. All in all, Canada has the largest area of legally protected forest land in the world.

The expanding amount of forest, especially old-growth, protected from development and logging has meant adjustments for the forest industry. As the boundaries of commercially available forest have shifted, so has the industry. In some cases, it means moving operations to more remote areas. In other cases, companies are staying in accessible locations but cutting smaller second- or third-growth trees. These and other changes, besides requiring new harvesting and processing methods, machinery and on-the-ground skills, have obliged industry to rethink production, planning and silviculture to remain competitive.

International Forestry Support

UNCED Forest Principle 11

In order to enable, in particular, developing countries to enhance their endogenous capacity and to better manage, conserve and develop their forest resources, the access to and transfer of environmentally sound technologies and corresponding know-how...should be promoted, facilitated and financed, as appropriate.

Forests were among the most contentious subjects discussed at Rio, with divisions arising between developed and developing countries, between consumer and producer nations. Since then, however, with the growing recognition of our common forest responsibilities, this polarization has softened considerably. There is now more consensus between developing countries and industrialized nations on many forest-related issues. One partnership to arise from these processes is the Costa Rica–Canada Initiative, which has joined the two countries to provide a neutral forum in which world forest stakeholders can discuss international forest arrangements and mechanisms.

UNCED made it clear that there is an international responsibility to support developing countries in their attempts to better manage their forests. This is something Canada continues to do through the Canadian International Development Agency (CIDA), which delivers Canada's development assistance, and the International Development Research Centre (IDRC), which funds development research. Over the years, the large number of forest-related projects sponsored by these agencies has established Canada as a world leader in forestry development. Since UNCED, Canada has continued its assistance to Asia, Africa, the Middle East, Latin America and the Caribbean, concentrating on projects in areas such as national forest programs, community forestry and rehabilitation of degraded areas.

To help address the special needs of developing countries, Canada announced an increase in foreign aid by at least eight percent per year for each of the coming years. Moreover, Canada was an early supporter of the New Partnership for Africa's Development and pledged $500 million toward an Africa Action Plan agreed to at the G8 Summit in Canada in June 2002.

In addition to providing development assistance, Canada also promotes sustainable forestry by transferring leading-edge forest technology to other countries. For instance, Canada is renowned for FireM3, the first fully automated system to monitor, map and model large forest fires on a national scale and disseminate interactive fire maps over the Internet on a daily basis. Canada has transferred this prototype technology to Mexico, the United States and southeast Asia.

CANADA AND THE WORLD'S FORESTS

Forests in developing countries are important for economic, environmental and social reasons. Support for sustainable forest management is one of the ways in which the Canadian International Development Agency (CIDA) achieves its mandate of contributing to sustainable development and poverty reduction. Here are just a few examples of how Canadian development assists countries in building capacities to realize the full potential of their forests.

Meeting basic human needs is a priority of Canada's development assistance program. In southern Africa, Canada is supporting long-term agroforestry research that is yielding tangible results. Trees are being used as cover to protect and restore soil during fallow periods. This results in increased food production and provides much-needed firewood.

In addition to food and firewood, locally important forest commodities such as traditional medicines and other non-timber products are also produced by forests. With Canada's support, the World Conservation Union (IUCN) is cooperating with governments and civil organizations in Russia to promote public involvement in managing and conserving forests. One major goal is to develop opportunities for those in eastern Russia, especially women and indigenous people, to earn income from the sustainable use of non-timber forest products.

Forests are also important socially as part of people's cultural and spiritual heritage. In Indonesia, the Kaltim Social Forestry Project is working with local groups to help rural people share in the forest's benefits. The objectives include building local forest management capacities and respecting the traditional rights of forest stakeholders.

The forestry efforts of non-governmental organizations (NGOs) are also supported. In Bolivia, Canadian and Bolivian NGOs are delivering the community-led Watershed Restoration Project in the Tarija Valley. Through education and technical assistance, the project promotes community-based reforestation and soil conservation to minimize erosion, prevent flood damage, reduce deforestation and provide food security for small rural farmers.

Despite the numerous benefits of the wise management and responsible use of the world's forests, there are many serious challenges to face. The absence of sustainable forest management practices, the advance of tropical deforestation and desertification, and the uncertain impacts of global climate change threaten the world's forests and the many people who depend upon them. Forestry issues continue to be addressed directly by CIDA programming or indirectly as components of the Agency's broader, cross-sectoral development programs.

For more information, visit the CIDA Forestry Advisors Network website at: http://www.rcfa-cfan.org

One of Canada's most recognized contributions to world forestry is the International Model Forest Network. Initiated by Canada at UNCED, the network enables developed and developing countries to work toward sustainable forestry, taking into account their different economic, political and cultural values. Mexico's Calakmul Model Forest was among the first to join the network. The site is part of the largest remaining tropical forest in Mexico and boasts one of the highest levels of biodiversity in the world. Its goal has been to balance the area's dependence on agriculture with forest conservation and development to reduce traditional pressure to clear the forest for farming. In 1997 and 1998, the Calakmul Model Forest was "twinned" with Canada's Eastern Ontario Model Forest. Twinning is used throughout the international network to help established model forests share information and technology with those under development.

Forest Science and Technology

UNCED Forest Principle 12a

Scientific research, forest inventories and assessments carried out by national institutions which take into account, where relevant, biological, physical, social and economic variables, as well as technological development and its application in the field...should be strengthened...

In the decade since Rio, Canada's forest science has been marked by the incorporation of the public's growing interest in non-economic forest values. A decade ago, forest research was largely directed toward enhancing industrial aims such as improving timber harvesting and processing techniques so as to increase production. Today industry-related research is just one of many facets of the forest science and technology (S&T) community. Equally important is research directed at non-commercial goals:

- Forests and water quality. Projects like the Turkey Lakes Watershed Study, north of Sault Ste. Marie, Ontario, are investigating how forest ecosystems and harvesting affect water quality and conservation.
- Measuring non-timber values. The Canadian Forest Service's socio-economic program is developing mechanisms for calculating the worth of non-timber forest values such as recreation, biodiversity, hunting and fishing.
- Forests and climate change. Canadian researchers continue to study forests with respect to the role they play in the world's carbon cycle.
- Non-timber forest products. More research and technology is being dedicated to developing and harvesting alternative forest products, including medicinal plants, berries and barks.
- Criteria and indicators. Forest researchers are continuing to improve methodologies to scientifically measure progress in sustainable forest management using the C&I framework.

FOREST RESEARCH PARTNERSHIPS PROGRAM

One program that underscores the principal forces reshaping forest science (broader research areas and more partnerships) is the Forest Research Partnerships Program. Jointly sponsored by the Canadian Forest Service (CFS), the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC), the program supports cutting-edge research in forestry.

The three-way partnership is an innovative approach to forest research, one that takes into account the expansion of forest science to include social, economic and cultural factors. This broader research scope allows for a holistic and adaptive approach to land management, industrial development, environmental protection and community involvement.

Under the Partnerships Program, CFS, NSERC and SSHRC fund university research that brings together Canadian-based businesses, the forest industry, provincial and territorial agencies, private sector forest organizations, Aboriginal organizations, NGOs and environmental groups. The program's research priorities, drawn from the CCFM-sponsored National Forest Science and Technology Course of Action, include methods for measuring indicators of sustainable forest management, studies of forest-dependent communities, economic implications of forest management activities, relationships with Aboriginal peoples and valuation of non-industrial activities. These projects are expected to result in better policy decisions, regulations and practices in Canada's forests.

Projects currently underway include a study on environmental valuation for use in forest management, development of an ecosite-based decision support system for sustainable forest management, development of a forest management strategy based on natural disturbances in northern Quebec, and various studies involving forest insect pests.

- Monitoring and inventorying. Researchers are continually improving the National Forestry Database, a compilation of forest statistics, and the National Forest Inventory, which catalogues the extent and health of Canada's forest land.

In addition to moving into new areas of research, forest S&T is becoming increasingly linked to policy and social values. For example, Canada's C&I framework of sustainable forestry was a policy goal that could only be achieved with the help of forest science. Similarly, as Canadians become more active in forest decision making, they are turning to science for reliable, objective information. Satellite imaging, forest inventories, monitoring forest health and forestry practices—these scientific pursuits are crucial for Canadians to assess whether their forests are being managed in a sustainable manner.

Even industrial forest research has changed gears. Industry has turned to forest S&T for the expertise and

technology it needs to manage forests for today's outcomes, including ecosystem health and non-timber benefits. Moreover, as the size of commercially available forest changes, new areas of industrial research are emerging, including intensive forest management, plantation forestry, and more efficient harvesting and processing technologies.

In partnership with three non-profit institutes devoted to forest research, the forest industry, and provincial and federal governments are engaged in research on several fronts. FERIC (Forest Engineering Research Institute of Canada) conducts research on forest operations, and develops technologies and equipment for harvesting, transportation, silviculture, small-scale forest operations and specialized needs. Forintek Canada Corp. is dedicated to research on solid wood products that has led to innovations in areas such as wood drying and protection, lumber, veneer and composite board manufacturing, and safety of building systems. Paprican (Pulp and Paper Research Institute of Canada) focuses on research on pulp and paper technology and environmental technology. It conducts research in areas such as fibre supply and quality, chemical and mechanical pulping, paper making and the environment.

Because forest science is headed in so many different directions, and because of the strong link between science and forest policy, collaboration has become more important than ever. Forest science has always been a highly collaborative field, but given today's growing demand for multi-disciplinary research, partnerships between researchers and non-scientific forest groups have become essential.

2002 AND BEYOND

As a country that relies on the forest to sustain both its natural environment and its standard of living, Canada has much to gain from embracing sustainable forest management.

In the decade since UNCED, we have accomplished a great deal. Our forest decisions are increasingly shaped by an active and knowledgeable public, including First Nations, NGOs, forest communities and private woodlot owners. Forest planning, harvesting, management and other activities have changed dramatically to meet the goals of ecological balance, biodiversity and conservation. Our leading-edge forest science, our sharing of resources and know-how with developing nations, and our work on criteria and indicators and model forests have all made Canada a world leader in sustainable forestry.

But sound forest management is a journey, not a destination. Many challenges lie ahead. We have conserved more forest area; now we must strike a balance between conservation and economics. We have developed a framework for measuring progress in sustainable forest management; we now need benchmarks against which to measure it. We have strengthened the links between science and policy; now we must establish the best possible strategic directions. We have steered forest research in new directions; now we need aggressive innovation to develop the practices and products of tomorrow. We have laid the policy framework; we now need sustained implementation on the ground.

In many ways, these challenges are a testament to just how far Canada has come in the decade since Rio. We have taken the forest principles articulated there and turned them into accomplishments—accomplishments that we can be proud of and that set the standard for decades to come.

Special Articles

FOREST 2020
A CONCEPT—AND A DIALOGUE—WHOSE TIME HAS COME

How will Canada respond to domestic and international pressure to better conserve forest ecosystems while ensuring the forest sector's economic prosperity and the well-being of resource communities?

In 1999 the Canadian Council of Forest Ministers (CCFM) began studying how Canada's forest sector might best address these issues over the next two decades, and mandated a task force to develop a common vision for forestry in the year 2020.

The task force proposed an innovative approach called Forest 2020, which aims to increase the conservation value of forests and the community benefits derived from forest resources while ensuring that the forest industry can continue to grow. All forestry jurisdictions in Canada agreed to work together to develop this approach, and to do so with an understanding of the need for flexibility across regions. Ministers committed to opening a dialogue with Canadians and key stakeholders in order to further define Forest 2020.

This dialogue began with discussions in April 2001 among a core group of CCFM Ministers, international experts, CEOs of forest product companies and the conservation community. In addition, conservation and aboriginal communities participated in workshops, and discussions were held with forest-reliant communities and other key organizations. There has been genuine interest from all sides in continuing to pursue an open and transparent process for refining Forest 2020. Many key opportunities were identified, including reducing pressure on existing forests, income diversification, and flexibility for Canada's forest sector. Questions such as how to link production, conservation and community well-being still needed to be explored, and there were knowledge gaps to be addressed, such as potential market opportunities. At their September 2001 meeting, CCFM Ministers drew from this initial dialogue the principles that will guide development of Forest 2020, and the Federal-Provincial-Territorial Task Force created a Vision Statement that incorporates them.

FOREST 2020
VISION STATEMENT

Through Forest 2020, the Canadian Council of Forest Ministers will further enhance the long-term sustainability of our forests by promoting greater social and economic prosperity as well as improved conservation of our forest heritage, by supporting:

1) **increased wood fibre production through the establishment of plantations of fast-growing high-yield tree species, and intensified silviculture in previously harvested, or second growth, forest areas;**

2) **a level of forest ecosystem conservation that is scientifically and socially acceptable; and**

3) **greater community stability and self-sufficiency grounded in the wise use of all forest resources.**

Bringing the Vision to Life

The concept of a varied and flexible approach involving fast-growing high-yield plantations is garnering more and more support across Canada as a way to increase wood fibre supply from the finite land base while promoting innovation. The three dimensions of Forest 2020—fibre production, forest conservation and community well-being—are inseparable, and integrating them in practice therefore requires an informed and constructive debate. Discussions will continue through 2002, and will be crucial for defining conditions and practical approaches for realizing the Forest 2020 vision. A business plan is being developed that will include possibilities for attracting investment in Forest 2020. You can contribute to this process for creating consensus on forest management and use. We encourage you to check out the latest information on Forest 2020, and send your comments through the Forest 2020 Website at *http://www.ccfm.org/forest2020*.

FOREST PRODUCTS

INTERNATIONAL MARKET DEVELOPMENT ACTIVITIES

Forest products have long been Canada's single most important export. In 2001, these exports totalled some $44.1 billion—the single largest contributor to our balance of trade that year. With Canadian forest products currently being shipped to more than 120 countries around the world, they are clearly of major importance to the economic well-being of all regions of the country, particularly the rural areas where many of the products are manufactured. All of Canada benefits from exporting forest products, from the pulp and paper products destined for Europe, to the lumber and wood panels for Japan, to the whole range of forest products sent to the United States.

Canada continues to focus on expanding trade opportunities with its global partners. In recent years, traditional export markets have come under increasing pressure from protectionist actions in the US, growing competition from domestic producers in European markets, and fierce competition in Japan from offshore producers. As a result, the industry and the federal and provincial governments are working collaboratively in an effort to increase export activities and develop new markets. Much of the emphasis recently has been on Asia, which is now recovering after several years of recession.

In 2001, the Forest Sector Advisory Council (FSAC), which reports to the Ministers of Industry and Natural Resources and includes senior level representation from a wide variety of stakeholders, proposed an export market development program for the Canadian wood products sector. In May 2002, the federal government announced a five-year $35-million initiative known as the Canada Wood Export Program (CWEP). The CWEP encourages Canadian wood products associations to undertake offshore export market development projects.

The CWEP involves a number of strategic elements, including technical and research efforts to encourage acceptance of Canadian wood products; building codes and related product standards to support introduction of North American style wood frame construction; support for increased industry representation in offshore markets; training of wood frame builders; and code officials and promotional activities. In China alone over the next five years, this initiative is expected to generate the construction of more than 15,000 wood frame homes and more than $50 million in annual ex-ports. Similar objectives are being defined for other export markets.

India, Taiwan and Korea are also viewed as promising markets for high value manufactured wood products. In India, for example, opportunities have already been identified for wood finishing materials, including flooring, door and wood trim, and India is expected to be the focus of a Minister-led trade mission in the fall of 2002. In Japan, which has long been a key market for Canadian forest products, efforts over the past year have led to that government recognizing the Canadian lumber grading accreditation system and agencies.

Additional market development initiatives are designed to ensure Canada's access to foreign markets. For example, Canada continues to be an active participant in the development of international standards through the International Organization for Standardization (ISO). Canadian industry and government specialists contribute to a number of ISO wood products standards, including lumber and wood-based panels. Canada has also been an active member of the Asia Pacific Economic Cooperation Wood Products Committee, which is working to harmonize wood standards in Pacific Rim countries.

While tariffs on forest products have generally been reduced in recent years, some countries have resorted to using non-tariff barriers to offset the effects of those reductions. The federal government, in close cooperation with the provincial governments and industry associations, is seeking redress through the World Trade Organization and the North American Free Trade Agreement for a number of market access issues that inhibit exports.

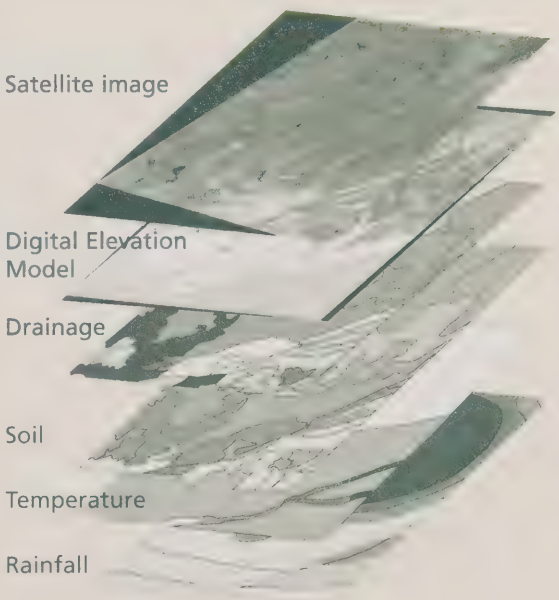
INFORMATION SYSTEMS
FOR SOUND LAND MANAGEMENT

Canada is currently working to develop the National Forest Information System (NFIS) in order to meet the ever-growing demand for comprehensive, accurate, and timely scientifically based forestry information. Although there is already a wealth of information regarding Canada's forests, it is spread throughout federal, provincial and industrial repositories, and is not readily accessible. Furthermore, today's complex policy questions cannot be fully addressed by individual scientific studies or single disciplines. The NFIS will therefore be used to integrate core data sets such as inventory, remote-sensing data and other geographic information using the latest high-speed data integration and distribution technologies. The system will also be based on a governance model and a set of internationally accepted protocols so that organizations can share and access information on Canada's forest resource.

One of the major features of the NFIS will be its ability to bring together massive amounts of geographical information that has already been collected at the local, provincial and national levels. This information must be aligned using a single reference system with standardized features, and be interpreted through tools designed for analysis. For example, the National Geo-References Information for Decision-makers (NatGRID) will convert spatial information into usable knowledge in order to help on-the-ground forest managers to predict changes in the forests and propose the best land management options.

Today, information about different economic, environmental and social values must be integrated in order to harmonize and coordinate the conservation and sustainable use of natural resources. By building the NFIS, Canada is ensuring that complex and accurate information will be available to those seeking to make the best possible decisions on behalf of all Canadians.

COMBINATION OF MULTIPLE LAYERS OF INFORMATION



CLIMATE CHANGE UPDATE

In 2001, after four years of international negotiations, participating countries reached an agreement on implementation of the Kyoto Protocol. The agreement includes rules for land use, land-use change and forestry (LULUCF) activities.

At negotiations in Bonn and Marrakesh, countries agreed to define "afforestation" and "reforestation" as creating new forests, and "deforestation" as the non-temporary loss of forest. They also agreed that countries could "account" for activities in forest management (with a limit on credits) and agricultural land management (with no limit on credits). While afforestation, reforestation and deforestation must be included in the accounting, each country has until 2006 to decide whether to include forest and agricultural land management. This will allow Canada time to improve its information collection and processing and to develop the necessary measurement systems. Finally, countries agreed on technical rules for accounting, reporting and reviewing greenhouse gases, including the sinks and sources resulting from LULUCF activities.

Collectively, these decisions are known as the "Marrakesh Accords". While international negotiations will continue in the coming years to further refine the technical details of the Protocol rules, the Marrakesh Accords are an important step, and will be the basis for many countries' decisions on whether to ratify the Protocol. If at least 55 countries representing at least 55% of industrial countries' emissions ratify the Protocol, it will enter into force for them.

In 2001 the Intergovernmental Panel on Climate Change (IPCC) released its Third Assessment Report—Climate Change 2001. The report addressed climate change through a variety of themes, including current knowledge and projections for the future, vulnerability and adaptation, and impacts and mitigation. The IPCC found that although warming results from a combination of both human and natural factors, there is new and stronger evidence to suggest that most of the warming observed over the last 50 years is attributable to human activities. It also concluded that conservation and sequestration of carbon on forest and agricultural lands, while not necessarily permanent, offer significant potential for the mitigation of climate change.

The federal, provincial and territorial governments are continuing to seek better ways to measure the impacts of afforestation, reforestation, deforestation and forest management on Canada's ability to meet its climate change commitments. The Government of Canada's Action Plan 2000 on Climate Change is funding the three-year "Feasibility Assessment of Afforestation for Carbon Sequestration" initiative, which should fill a number of information gaps while exploring opportunities for large-scale afforestation on private land. As well, a national forest carbon monitoring, accounting and reporting system designed to meet Protocol requirements is currently under development.

UNITED NATIONS FORUM ON FORESTS

The United Nations Forum on Forests (UNFF), currently the premier international forum for discussion of forest-related issues, was established in October 2000 with the main objective of facilitating and promoting implementation of the proposals for action of the Intergovernmental Panel and Forum on Forests (IPF/IFF). UNFF was also charged with considering the parameters of a mandate for developing a legal framework for all types forests and devising approaches for financial and technology transfer to support sustainable forest management (SFM). Furthermore, UNFF was given responsibility to providing guidance to the Collaborative Partnership on Forests (CPF), composed of key international actors with forest-related mandates.

At UNFF1 (2001), participating countries developed a structure for the four sessions to follow. It was decided that each would include a multi-stakeholder dialogue and discussion on progress towards SFM under specific themes. UNFF2 (2002) focused on issues related to conservation and protection, as well as combatting deforestation and forest degradation. At UNFF2, Ministers adopted a message to WSSD consistent with the need to ensure a high profile for forest issues internationally, and called for a number of actions, including:

- that SFM be advanced as a critical means of dealing with a variety of cross-cutting issues such as poverty, land and resource degradation, food security, and access to water;
- that political commitment to achieving SFM be enhanced by setting it as a priority on the international agenda, taking full account of the linkages between forests and other sectors;
- that countries take action on domestic forest law enforcement and trade in illegal forest products; and,
- that countries and the CPF be called upon to accelerate implementation of the IPF/IFF proposals for action.

UNFF3 (2003) will deal with the economic aspects of forests, forest health and productivity, and maintaining forest cover to meet present and future needs.

Canada will pursue its efforts under the aegis of the UNFF and the CPF to steer international efforts beyond talk and into action, and to increase recognition of the cross-sectoral importance of forests. Indeed, preparations for WSSD now emphasize the central importance of forests for a multitude of other issues such as poverty, watershed management, land and resource degradation, and access to affordable energy.

As Canada strongly believes that sustainable management of the world's forests requires more than voluntary efforts, we will continue to promote the adoption of a legally binding instrument on all types of forest as the only effective means of encouraging countries to fully and urgently implement SFM so as to meet the challenges that continue to plague the world's forests.

Additional information on past and ongoing forest discussions at the United Nations can be found on-line at: *http://www.un.org/esa/sustdev/forests.htm.*

AN INTERNATIONAL NETWORK

Working with the *International Model Forest Network Secretariat*, Canada, and in particular the Canadian Model Forest Network with its more than 400 partners, has provided strong, ongoing support in the development of many of the sites that make up the international network. Canada has played a major role in promoting the concepts, tools, and know-how to a large international community. Yet the application of the concept has remained flexible and fully at the service of the local partnerships that make it work at the site level.

Governance and civil society

Whether it be the Berau in Indonesia or the Ngao in Thailand, perhaps the most important contribution that Model Forests make is to provide a non-threatening and constructive forum in which all stakeholders, from those with power to those without, can join forces on a common issue: sustaining their environment and the values it holds for each. In many instances the Model Forest forum has represented the only mechanism through which these stakeholders have interacted as a group. This support for civil society has had a remarkable impact on improving the quality of debate and level of understanding of the many issues at play, on building mutual trust among non-traditional partners and thereby reducing conflict, and on building capacity at the local level to address complex resource management issues for the benefit of all stakeholders at all levels.

Sustainable economic opportunities

For the Gassinski partnership in Russia, the main objective of the Model Forest has been to help keep forest-dependent communities alive and in balance with nature. Important outputs from the work of this partnership include greater protection of threatened and endangered flora and fauna, improved protection of forests from fire, and the identification and development of sustainable economic opportunities for the area's many small forest-dependent communities. As for the latter, major successes have been achieved in creating value-added wood processing industries—in one case generating nearly full employment in a Nanai (indigenous) village by establishing harvesting norms and new jobs in the collection and processing of non-wood forest products—and working with all levels of government and the emerging private sector on a sustainable long-term strategy for the area's economic development.

Leveraging and pooling resources

The Model Forest approach has been very enthusiastically adopted in Chile. The Chiloe Model Forest continues to provide multiple benefits to its partnerships. It has focused its energies and resources on a number of priority areas, including protected spaces, indigenous knowledge, traditional crafts, small enterprise, ecotourism, improving export markets for the island's products, and education and outreach among the island's many small farmers. The work of the partnership has generated a very impressive 5:1 leveraging of financial and technical resources against the initial contribution of the national government, while the physical area of the Model Forest has been increased from its original 170 000 hectares to the present one million hectares.

THE XII WORLD FORESTRY CONGRESS
QUÉBEC CITY, SEPTEMBER, 2003

Canada will be hosting the XII World Forestry Congress in Québec City from September 21 to 28, 2003. This highly prestigious international event is hosted every six years by a country selected by the United Nations Food and Agriculture Organization (FAO). The theme of the upcoming Congress, Forests, Source of Life, will cover three broad areas: forests for people; forests for the planet; and people and forests in harmony. The Congress will spotlight technology and innovation and will bring important insights into related topics such as education and training.

The objective of the Congress is to share experiences and learn from each other's best practices in order to improve sustainable forestry worldwide. Globally, we have started down the path to sustainability. On this path, each country is at times a teacher, and at times a learner. This is what the Congress is all about—information sharing, teaching and learning. For example, Canada's Model Forest Program, in which diverse partnerships of local individuals and organizations work collaboratively to integrate, apply and test economic, environmental and social objectives into their forest sites, is now emulated in 11 other countries. Canada in turn is learning from countries that use plantation forestry and intensive silviculture to address growing wood product demand and respond to calls for more forest land rehabilitation.

The week-long Congress promises to be a highly engaging event, with some 5 000 forest delegates from 180 countries. Participants will have an opportunity to share their experiences through a variety of conferences and workshops on a range of forestry issues and to learn firsthand about Canada's forests. The Congress will feature internationally renowned speakers, over 500 adjudi-cated papers, and posters, exhibitions, and special events. There will be an opportunity to take part in study tours and forest excursions across Canada—it will surely prove to be an enriching experience from a scientific, technical, and cultural perspective.

In September 2003, forest practitioners from around the world are invited to visit the world heritage site that is Québec City. For more information on the Congress, including venues and registration, you are invited to visit its Website at *http://www.wfc2003.org*.

CONTACTS

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Natural Resources Canada | Ressources naturelles Canada
Canadian Forest Service | Service canadien des forêts

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Was the information in this year's State of Canada's Forest useful to you?

- ❑ Very Useful
- ❑ Somewhat useful
- ❑ Not useful

What did you use the report for?

- ❑ Information only
- ❑ Adopting Canadian sustainable forestry programs / initiatives
- ❑ Teaching tool
- ❑ Other(s), specify

Overall, did you consider the information in this year's report factual and credible?

a. Yes
b. No
c. Somewhat
If b or c, please explain

Which section of the report did you like the most and why?

- ❑ Long feature article
- ❑ Statistical profiles
- ❑ Other (specify)
- ❑ Short special articles
- ❑ Year in Review

Did the report strike the right balance in presenting science and policy information?

a. Yes
b. No
If no, please explain.

What forest-related topics would you like to see featured in future annual reports?

Additional comments or suggestions:

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National Parks System Map

The Boreal Forest

Draped like a great green scarf across the shoulders of North America, the boreal or "northern" forest is Canada's largest ecosystem.

Natural Resources Canada / Ressources naturelles Canada
Canadian Forest Service / Service canadien des forêts
Geomatics Canada / Géomatique Canada
CANADIAN Geographic

This forest has shaped our history and economy

The boreal forest fed and sheltered Canada's first peoples; clothed, transported and healed them. It was the substance of their tools and crafts, the source of their spirituality. It was bark and pitch for canoes, wood for fuel, skins for clothing. It was a menu of fowl, meat, fish, berries and herbs.

The Ojibwa, whose territory extended outward in all directions from Lake Superior, were one of many aboriginal peoples living in the boreal woodlands. A child born into Ojibwa society knew the riches of the forest from its earliest moments. The baby was wrapped in a rabbit-skin robe and diapered with absorbent sphagnum moss (sphagnum has antibiotic properties that prevent infection). A child's eating bowl might be carved from a spruce burl, and its health was guarded with teas and medicines made from roots, bark, berries, leaves and flowers.

The family wigwamin was a structure of spruce poles covered in squares of birchbark sewn together with long strands of peeled spruce root, as thin and strong as snare wire. Spruce boughs covered its floor, sweetening the air and providing a cushion for sitting and sleeping. The boughs' smell and needles were a natural repellent to small mammals, reptiles and insects. Girls learned hide tanning, leatherwork, and the construction of baskets and cooking pots from birchbark. Young men joined the hunt, armed with birchwood arrows, bows strung with animal gut, spears and knives of wood, stone and bone. These hunters and gatherers took only what they needed from the forest, a part of its delicate balance. After the hunt, or even after activities such as berry picking or spruce-root gathering, the people expressed gratitude to the Great Spirit and Creator.

For early northern natives, the boreal forest was not so much a landscape or resource, as a world, a complex natural support system on which they founded their lives.

The introduction of logging on the forest's southern fringe during the late 1800s brought lumbermen who made a living by cutting trees to build a new country.

The global population explosion of the past half-century has pushed the demand for lumber and pulpwood to levels unimaginable 70 or 80 years ago. At the same time, technology has provided loggers with greater forest access and more efficient harvesting tools.

7,000 — 8,000 years ago

- Forest cover gradually regenerates over Canada following the last Ice Age which ended some 13,000 years ago.
- Native populations and cultures become established across the boreal forest; controlled fires often set to encourage animals and plants needed for survival; and to facilitate hunting and travelling.

1670 to early 1900s

- The fur trade begins. European trade and culture affects animal populations and Native ways of life (1670-1870).
- Demand for lumber depletes forests in the south and east. This pushes forestry activities into the southern fringes of the boreal forest (mid-1880s).
- Growth of literacy and consumer spending spurs the demand for paper. The first pulp and paper mills are established in the boreal forest (late 1880s to early 1900s).

Post World War II

- Existing pulp and paper mills expand and new ones are built.
- Power saws replace hand saws and axes (1950s).
- Tractors replace horses in the woods, and trucks begin to replace water transportation (1970s).
- Improved harvesting equipment increases cutting efficiency (1980s).
- Technology optimizes the use of trees and wood waste, including species once considered "weeds" (1990s).
- Utilization of recyclable material (e.g. newspaper) increases (1990s).

The boreal forest occupies 35 percent of Canada's land area and its vitality creates one of the country's most significant ecological communities.

It stretches between southern grassland and mixed hardwood trees, north to the tundra. Its animals, plants and products affect every Canadian every day. They include paper products made strong by the long fibres of black spruce, to jack pine railway ties and telephone poles that keep communications going. Even the air we breathe is enriched with oxygen from this massive photosynthetic machine. The northern forest — named after Boreas, the Greek god of the north wind — is an integral part of who we are as Canadians.

Annual rings in the slow-growing coniferous trees of this forest, some hundreds of years old, provide a living record of atmospheric conditions and changes in climate. Canadian history is etched in the trails, graves, roads and campsites that mark the lakes, bogs and hills of the boreal forest. Our economy is buoyed by its industries, our climate is moderated by its trees, and our national imagination is informed by memories and myths of seeing it up close by canoe and snowshoe.

Since the first appearance of spruce trees in Canada's fossil record about 60 million years ago, the boreal forest has adapted to the massive forces of ice, fire, insect infestation and disease. In fact, without such natural disturbances, the forest as we know it today would never have come to be. These natural agents of change are necessary for the maintenance of the forest's ecological balance. However, human activities have occurred in the last century. Such activities as tree harvesting, manufacturing, resource development and intensive recreational use — in concert with natural alterations — have produced cumulative and long-term effects which are difficult to measure precisely. In response, Canada has committed itself to the sustainable development of the boreal forest. Through efforts like development of the National Forest Strategy and the publication of this poster-map, the goal is to protect the forest's social, spiritual, economic, esthetic and environmental dimensions for present and future generations.

Canada's boreal forest is part of a great northern circumpolar band of mostly coniferous forests extending across the subarctic latitudes of Russia, Scandinavia and North America.

Globally, the boreal forest comprises about a quarter of the world's closed-canopy forest, and plays a significant role in the earth's environmental balance and life on this planet. Besides being a producer of oxygen, the boreal forest absorbs and stores carbon dioxide and so may play a critical role in the phenomenon of global warming. Canadians cannot forget they are custodian to one-third of this essential life force.

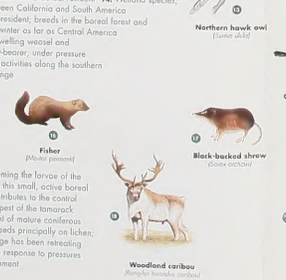
The boreal forest is a dynamic system of shrubs, trees, herbs, mosses, micro-organisms, insects and animals interacting among themselves and with rock, soil, water and air.

The predominance of a few coniferous species — spruce, fir, pine and tamarack — contribute to its overall uniform appearance from afar. Yet, at closer range, depending on climate, topography, soil, effects of fire, insects and disease, the composition of the boreal forest varies widely. The result is a patchwork of stands of trees, large and small, old and young, at different successional stages, each of which supports different birds and fur-bearing animals. The boundaries of the boreal forest are closely related to climate. In the north, hardy tamarack and black spruce hug the ground, and grow so slowly as to be finger-sized after 100 years. Beyond them lies the tundra. Move south, where it's warmer and the soils and drainage are better, and eventually boreal species are driven out by hardwoods and other deciduous trees of the mixed forest. Although the boundaries of the boreal forest are gradual, creating zones of change — known as ecotones — between it and its neighbouring ecosystems, the northern limit of the boreal forest, or treeline, is a demarcation that looms large in the Canadian psyche. This is the point at which wood for fuel, shelter and tools is absent, leaving the human species exposed and vulnerable on the arctic plain until they reach the arctic waters, where the oils and skins of sea mammals are available for warmth and protection.

The hardy trees of the boreal forest are well adapted to the north.

Many can grow on only a skiff of sandy soil over bare Precambrian rock. Conifers like black spruce can grow with roots in the wet acidic soils of boreal peatlands, often on top of frozen subsoils. Although species diversity is lower in the boreal forest than it is in forests farther south, the need for constant adaptation to a harsh world results in high genetic diversity. This contributes a resilience to cope with disturbances. In spite of cold, sparse soils, and a short growing season, the extent and stamina of this forest has created a living fabric with monumental value as a resource as well as an important influence on global climate.

1. Characteristic throughout the boreal forest across a wide range of sites, including peatlands, where it often forms pure stands; elsewhere in mixed stands **2.** Common throughout the boreal forest across a broad range of site conditions; rarely in pure stands **3.** Common throughout the boreal forest, most notably in the prairie-forest transition zone in the south-central region; occurs in both pure and mixed stands across a range of upland conditions, prefers fresh, well-drained, loamy soils **4.** Occurs throughout the boreal forest, most commonly in the prairie-forest transition zone in the south-central region, mainly in mixed stands on rich, moist sites **5.** Common on sandy and shallow soils in eastern and central regions, typically found in even-aged, fire-origin stands, often with black spruce; replaced in northwest by lodgepole pine **6.** Characteristic throughout the boreal forest on fresh upland sites; rarely grows in pure stands **7.** Common in eastern and central regions across a broad range of conditions; typically in mixed stands **8.** Common in peatland areas, especially in the north; typically found in association with black spruce; absent in far northwest **9.** Common shrub of cold acid bogs and wet shores **10.** One of first plants to become established on disturbed ground after fire or clearing **11.** Typical forest floor species **12.** Inhabitant of forest floor, bogs, forest edges and clearings **13.** Year-round boreal resident **14.** Wetland species; winters between California and South America **15.** Summer resident, breeds in the boreal forest and migrates in winter as far as Central America **16.** Boreal-dwelling weasel and important fur-bearer; under pressure from human activities along the southern limit of its range **17.** By consuming the larvae of the larch sawfly, this small, active boreal mammal contributes to the control of an insect pest of the tamarack **18.** Inhabitant of mature coniferous woodland, feeds principally on lichen; southern range has been retreating northward in response to pressures from development



Copies of this poster-map may be purchased from:
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Vegetation cover within the boreal forest

- Coniferous forest — Continuous forest in which 76 to 100 percent of the canopy is composed of coniferous trees
- Mixed forest — Continuous forest in which 26 to 75 percent of the canopy is composed of coniferous or broadleaf trees
- Broadleaf forest — Continuous forest in which 76 to100 percent of the canopy is composed of broadleaf trees
- Transitional forest — A mixture of land "Continuous" forest occurs where forested land occupies more than 50 percent of the area; covering up to 50 percent of the land area; tree density varies from open woodland to scattered groves
- Ecozone boundaries
- Southern limit of the boreal forest (boundary between Manitoba, Ontario and Quebec)

Percentage of community income dependent upon forest products
• more than 50 percent • more than 75 percent • more than 90 percent

Vegetation and land cover outside the boreal forest

- Coniferous forest
- Mixed forest
- Broadleaf forest
- Tundra
- Barren land
- Perennial snow and ice
- Cropland
- Rangeland and pasture

The vegetation zones on this map come from an interpreted satellite image. Analysis and classification were done by the Manitoba Remote Sensing Centre and Geomatics Canada.

The scale is 1:10,750,000

Given the efficient but dispersed trade networks that existed before the arrival of the Europeans — and the 9,000-kilometre breadth of the boreal region — the forest must surely have seemed immense to the Cree, Ojibwa and Beothuk who lived there.

It certainly seemed endless to the first Europeans to arrive. Lacking the scientific data available today, the native peoples and early foreigners might also have assumed that the forest had existed since the beginning of time. But in geological terms, it is quite new. Until some 13,000 years ago, much of what is now Canada was covered with the glaciers of the last Ice Age. As the glaciers retreated north, vegetation reclaimed the land. But it was not until some 5,000 years ago that the boreal forest took on its present character.

European fur traders who arrived during the late 1600s brought a businesslike attitude. During the 18th and early 19th centuries, they extracted from the forest millions of beaver pelts for the production of fashionable hats. Animal populations that had been stable for centuries were disrupted. Natives abandoned age-old cultural ways to trap for profit.

The growth of literacy and publishing at the end of the 19th century, and the adoption of wood fibre rather than cotton as the main ingredient of paper, created a demand for pulp logs, putting added pressure on the forest. The pressure intensified with the establishment of northern pulp and paper mills, which consumed more logs and brought industrial byproducts with them.

Axes have been replaced by chainsaws, which in turn are being replaced by mechanical harvesters capable of gathering thousands of trees a day. Logs that were once moved to the mills along waterways in great spring drives are now trucked from the forest year round. An estimated 50 percent of Canada's vast boreal north is now accessible to the forestry industry via highways and logging roads.

While Canadians have not always been as considerate of the forest as they might have been, the forest has been constant in its benevolence to Canadians. At the moment, forestry is our largest natural resource industry, and we are the world's greatest exporter of wood products. An estimated 165,000 Canadians are employed directly by boreal forest industries: in logging and pulp and paper; in forest management and silviculture; in wood industries whose products range from mouse traps in Niagara Falls to railway ties in Thunder Bay and hockey sticks in Victoriaville. Thousands more deliver services and goods to these industries, and sell and distribute forest products. The person in Montreal who makes steel parts for lumber-drying kilns is as dependant on the forests as the trucker who transports jack pine and spruce logs to the mills of Prince Albert, or The Pas.

The boreal forest provides Canadians with more than jobs and a trade surplus in wood and paper products. For millions, it is a recreational and spiritual refuge, a place to hike, canoe, camp, fish, take photos, or just look around and breathe the air. Its lakes, trees and rock formations are the base for hundreds of millions of dollars worth of tourism.

For all of these reasons it is crucial that, wherever possible, the boreal forest be managed for the well-being of future Canadians. Good forest management is expensive and complex. It must balance the interests of industry, educators, aboriginal groups, private land owners, tourist operations, outdoor enthusiasts, and conservationists. It must concern itself not just with individual plant or animal species but with the integrity of an ecosystem comprised of thousands of organisms. For example, forest managers might ask how will song-bird nesting or micro-organisms in the soil be affected by the removal of mature birch or tamarack.

During the early 1990s, forestry officials set out to develop a master plan that would ensure a co-ordinated, ecological approach to forest management in Canada. The result was the National Forest Strategy, endorsed in 1992 by all levels of government as well as by representatives of industry, aboriginal peoples, educational and conservation groups.

The strategy views the boreal forest as being as important to the hiker, the ecologist and the everyday citizen as to the lumber industry and the commodities trader. It encourages research that might add to the knowledge of how forest ecosystems operate and how their biodiversity and vigour can be protected and enhanced.

Current management of the boreal forest falls largely to the provinces, which control 92 percent of it. Provincial governments allocate harvest rights, monitor harvesting, and encourage sound logging and reforestation practices. The federal government, which controls just over five percent of the boreal forest, contributes scientific research, economic development, international trade and relations and pesticide regulation. Both levels of government *protect significant tracts of forest from logging — in national and provincial parks, wildlife* sanctuaries, conservation areas and forest preserves.

Between 1977 and 1991, expenditures on forest management in Canada increased from $500 million annually to $2.5 billion. Much of the increase has gone to the development of sustainable forestry practices in recent years. Another portion of that increase has gone into progressive experimental projects such as the development of natural pesticides and biological control agents which, it is hoped, will gradually replace chemical pesticides and the chemical herbicides used in reforestation. Other projects include the development of disease- and insect-resistant trees for replanting.

The boreal forest extends across seven major ecozones — areas that represent large ecosystem units and have characteristic landforms and climate.

The taiga cordillera, taiga plain, taiga shield and Hudson plain form the northern tier of the forest. "Taiga" is a subarctic area where the transition from forest to tundra occurs. As part of that transition, there are extensive treeless areas. A "cordillera" is a group of mountain ranges and valleys; a plain can be level or rolling land, and "shield" is rolling terrain with exposed Precambrian rock.

Three other ecozones form the southern tier of "closed" — more or less continuous — boreal forest. They are the boreal cordillera, in the western mountains, the boreal plain in the Prairies and the boreal shield that extends from northern Saskatchewan all the way to Newfoundland.

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Managing the forest for the future

Canada's boreal forest is a resilient ecosystem,

a survivor in the face of numerous challenges. But its interlinked life forms are under pressure, and maintaining its health is the goal of Canadians and their governments.

Until the late 1800s, the only disturbances to Canada's boreal region had been fire, insects, climate, high winds and other natural forces.

During the 1890s, however, loggers appeared in the North, and with them the forces of industry. The new forces were strong, and over the succeeding century the necessity to manage the forest became apparent. And the forest was not limitless, as the loggers found out as they had to go farther and farther north to find suitable timber.

Much is being done to understand the boreal ecosystem and to prevent damage to it. Public awareness is growing about the value of the boreal forest and the harm that can befall it.

Aboriginal people who made the boreal forest their home saw themselves as part of a world imbued with spirits.

The animals, the trees, even the lakes and skies, possessed spirits that were akin and yet distinct from their own. Thus the religions of the Innu, Cree, Ojibwa and other Algonkians in the east, and the Dene (or Athapaskans) in the west, shared the belief that the people should seek the guidance of these spirits for success on earth.

Animals provided food and skins for clothing. But if the animals' remains were not treated with respect, their spirits not appeased, they would not reveal themselves to the hunter in future. So, the Innu wore painted caribou skin coats to please the animals' spirits and make the hunt successful.

As hunters, these first people of the boreal forest were nomadic, carrying their belongings. Clothing became a principal outlet for artistic expression. Moosehair embroidery and coloured thread embellished coats, mitts and moccasins. Porcupine quills were worked into floral and geometric designs.

Among the favourite folk tales of French-Canadian voyageurs was that of *le chasse-galerie*, the great canoe that the devil himself, for the mere price of a few souls, would guide through the sky, carrying homesick voyageurs back for their New Year's *veillee*.

With its hard climate and thin soil, the boreal regions remained only sparsely settled, and human influence on the land (until the loggers arrived) was minimal. The forest stayed, as Robert W. Service wrote in "The Spell of the Yukon," "Plum-full of hush to the brim." It embodied Bliss Carman's belief that "The greatest joy in nature is the absence of man."

It was this wilderness, this "large and lonely land" as Manitoba poet Thomas Saunders called it in "Beyond the Lakes," that drew painters north in the 1910s and 1920s, artists bent on seeing a Canadian landscape without peering through European filters.

For the whole nation, it seems, there was a northern consciousness. "I have never been to James Bay," Stephen Leacock wrote in 1936, "I never got to it; I never shall. But somehow I'd feel lonely without it."

Grey Owl, the Englishman who masqueraded as an Indian, touched many with his similar thought: "Give me a good canoe, a pair of Ojibway snowshoes, my beaver, my family and 10,000 square miles of wilderness and I am happy."

Wade Hemsworth, a veteran of northern survey crews in the 1950s, has written songs that capture both the haunting loveliness of the boreal forest, and its demoniacal side.

Black Tobey fell to swearin'; the work went slow.
The state of our morale was a-gettin' pretty low.
The flies swarmed heavy; it was hard to catch a breath
As you staggered up and down the trail talkin' to yourself.

And the blackflies, the little blackflies,
Always the blackfly no matter where you go.
I'll die with the blackfly a-pickin' my bones
In North Ontar-i-o-i-o, in North Ontar-i-o.

—from "The Blackfly Song."

Biting insects such as the blackfly and mosquito can make human life uncomfortable, but these insects play a vital role in the boreal food chain. Many species of fish and birds — including a number of migrants that breed in the boreal forest — depend on these insects for food. They are also important pollinators of plants at ground level.

But then in "The Wild Goose" . . .

I've worked in the bush and spent money in town;
I'd like to get married, but I can't settle down.
At the last portage, when I'll pack no more
Let me fly with the wild goose high over north shore

With the wild goose,
The wild goose,
High over the north shore
And I'm going home.

It seems that spirits still linger in the boreal forest.

Spirits are alive in the works of native artists who came to prominence in the 1960s and 1970s, including Norval Morrisseau, an Ojibwa from the Lake Nipigon area. They drew their inspiration from traditional stories and art styles, including pictographs and petroglyphs, and painted mythological figures in a style both modern and ancient.

These images remind us that there is more to the boreal forest than trees and other living creatures. They reflect the roots of our culture.

Flames ravage the boreal forest regularly, leaving a landscape of [illegible] trees and blackened earth. But from this charred ground, new life emerges. Plants suited to the scorched terrain, trees more robust than the aged ones they replace. Fire means renewal to the boreal forest, a central part of its life cycle as ancient as the forest itself.

For most of the 20th century, people hoped to eliminate fire from the forest. Destroyed by the loss of valuable timber, governments and lumber companies fought every accessible forest fire in every possible way and educated the public about the danger. Now, the firefighter's priorities have become the protection of human life and property and the preservation of the commercially valuable stands. In remote regions, or accessible areas where forest renewal is overdue, fire is allowed to take its course.

The boreal forest is a patchwork of different tree populations, and they burn naturally at different intervals. Some jack pine stands may in the past have burned every 15 to 35 years; certain spruce forests may have been hit by fire every 50 or 100 years; and some red or white pine stands may have burned only every two centuries. Prairie grass fires consume bordering aspen groves as often as every three to 15 years. New aspen grows from the roots of old trees, even if those trees are charred, so fire ensures them a vigorous life. Similarly, black spruce and lodgepole pine can keep live seeds in their cones for years, seeds that are released when fire kills the trees themselves.

All trees in the boreal forest, in one way or another, depend on fire. It starts a new life succession (the only named seaweed is generally first to grow on the charred land), using the nutrients produced by the fire from the litter of the forest floor.

Lightning accounts for about 85 percent of the 2.8 million hectares of forest burned annually. People, including careless campers and smokers, cause the rest. The fires caused by people are more numerous, but burn a smaller area than those ignited by lightning.

There are about 9,000 forest fires in Canada annually. Most are small, burning just a few hectares. Some are huge, raging for weeks and consuming 100,000 hectares or more. An average of 2.8 million hectares is burned every year, virtually all in the boreal forest (eastern hardwoods and the west coast rain forest are not as susceptible to fire). About a third of the area lost is in Canada's commercial forest. To compare, about 800,000 hectares of forest are cut every year.

Forest fires vary. They can smoulder underground, or burn just the surface growth and litter. At their most dangerous and spectacular, they can consume the whole forest, spreading from crown to crown faster than a person can run.

Wind is the ally of fire. It can fan the flames and carry sparks over vast areas, turning a small fire into a great blaze in a matter of hours. Wind is one reason fires are generally worse during the day than at night — winds are stronger, temperatures are higher, and there is less humidity.

When mining and lumber towns grew up in the boreal forest in the late 19th century, they found themselves in harm's way. A forest fire near Timmins, Ont. in 1911 burned 200,000 hectares and killed 73 people. Another in the same region in 1916 destroyed several towns and killed 244 people. In 1922, fire destroyed 6,000 homes and 43 people died.

Not surprisingly, forest fire detection and suppression evolved. Lookout towers were built, portable pumps and other firefighting supplies were stockpiled, and communications systems improved. The 1920s saw the beginning of fire detection by aircraft, which by the late 1960s had replaced lookout towers. In the 1920s as well, a Forest Fire Weather Index was created which links weather and forest conditions to provide daily ratings of local forest fire risk.

Surveys have identified lightning-prone areas and the behaviour of fires has been studied to discover how the ground cover will catch or spread.

Still, the job of controlling forest fires comes down to people doing hot, dangerous work on the ground. In a direct attack, firefighters with shovels, portable pumps, hoses and bulldozers try to extinguish the flames on the spot. If the fire is too hot or is spreading too quickly, crews use the indirect approach of a backfire or burnout. A strip of forest downwind of the fire is lit by hand-held torches or charges are dropped by helicopter. The hope is that the approaching main fire will die out when it hits the burned line.

Rain remains the firefighter's best friend. But perhaps the next best is the water bomber, particularly an aircraft that can scoop up water while skimming a lake. The Canadair CL215, introduced in 1967, is the only plane specifically designed for this. It can collect more than 5,000 litres of water in 10 seconds, and drop it over a fire in one second.

Protected areas and commercial forest land

Sustainable forest management has long-term payoffs

Each province and territory has their own regulations and legislation. However, they have, along with the federal government and the forest community, developed a National Forest Strategy to support sustainable forest management, nation-wide. As well, when Canadians plan their forest activities, they have an obligation to honour international agreements such as the UN's Convention on Biological Diversity.

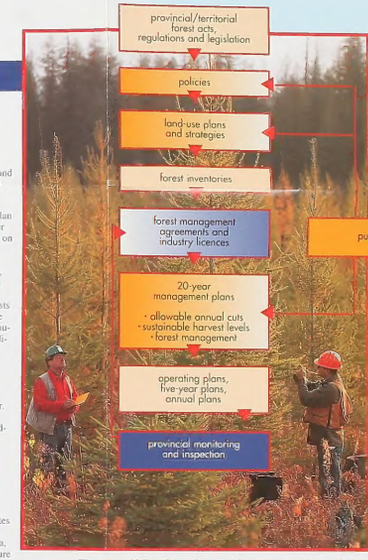
The aim of the strategy is a sustained supply of timber, healthy forests and watersheds and a guaranteed future for their animals and fish. While governments own 92 percent of the boreal forest, there are competing interests in how the land is used. Governments, industry, private cottagers, hunters, recreationists, and Aboriginal communities all have interests, and in some cases legal or traditional rights, in how the forests are managed, and the purpose for which they are used.

Companies with long-term licences to forest land pay cutting fees to the government, plan and carry out sustainable management in return for harvesting timber. Canadian use of public forests starts by looking at the forest as a number of ecological units with distinct landforms, climate, soil and vegetation.

The goal of the National Forest Strategy is to maintain healthy forest ecosystems.

Regularly updated forest management plans identify sites for silviculture using what is called a landscape-level approach. This means industry concentrates on one area, so that 50 years from now there will be a block of mature forest. Silviculture means harvesting trees, promoting natural regeneration, preparing for tree planting, controlling vegetation that competes with valuable tree species and thinning overly dense stands.

Natural regeneration often provides ample commercial species in the boreal forest. When it doesn't, foresters may supplement the natural process with some planted trees, or establish and maintain whole forest plantations. There is widespread agreement to avoid using chemicals against destructive insects wherever possible, replacing them with biological controls and an integrated approach to the control of harmful forest insects. Among other things, this means early detection so an infestation can be precisely located, a good mixture of tree species, and insects that prey upon one another.



There are guidelines for road construction, stream crossings and how to use machinery. Construction sites are inspected to make sure nobody leaves behind oil drums, containers emptied of their seedlings or other industrial garbage.

Management of the boreal forest has to be flexible because the forest itself is so diverse.

There are universal standards, but action must be local. Local managers keep track of the harvest and note the growth rates of different tree species. They also watch for fires, insect outbreaks and tree diseases, and monitor the condition of the soil and watersheds. They keep track of what it costs and respond to any changes in the forest. Such a long-term resource doesn't come cheaply.

Sustainable forests: A Canadian commitment

(Canada Forest Accord, 1992)

Our goal is to maintain and enhance the long-term health of our forest ecosystems, for the benefit of all living things both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations.

A constantly changing forest

During the past three million years, boreal trees were driven again and again to the edges of what is now Canada as ice sheets invaded the continent. When the glaciers retreated the last time, to the arctic islands and mountain tops, the plants and trees of the boreal forest recolonized the newly exposed land.

This is the backdrop to change in the forest that goes on in cycles ranging from seasonal to those that take millenia. In the last change from glacier to forest, the northernmost species brought life swiftly in wind-blown or water-borne seeds. These were white spruce, black spruce, tamarack, poplars, alder and willows. Jack pine is a relative newcomer, absent from the northern boreal forest as well as eastern Quebec and Labrador.

Viewed from an aircraft, the boreal landscape is a patchwork of even-aged stands that developed following fires or insect outbreaks.

Rivers, lakes and wetlands add to the effect as do landforms left over from the glaciers, like eskers, moraines and outwash plains. Ancient lake bottoms, or clay belts, are zones of fertility in the meagre soils of the boreal shield. Permafrost further complicates forest and tundra.

Two great transcontinental bands of approximately equal width distinguish this "great green scarf." In the south, there is a continuous or closed-canopy forest. In the north is the little known open lichen woodland.

Lichen woodland is a feast for the eye but unfamiliar because it has few settlements or roads and a plague of black flies. Upland stands of scattered spruce and jack pine form attractive "parks" carpeted with yellow, green and light grey lichens. Recently burned areas are covered with birch, blueberries and evergreen dwarf shrubs. Tamarack is common in wet fens, while shallow-rooted [illegible] frozen and uplifted bogs known as *palsas* [illegible] along the arctic edge of the lichen wood land, where the ground is permanently frozen, patches of stunted forest grow between tundra-covered hills.

The southern, continuous boreal forest has taller trees which form canopies to allow moss, herbs and shrubs to thrive as ground level. This is the mainstream forest that feeds the mills. Frequent fires have left behind aspen, jack pine, birch and black spruce that take over in the charred soil. Fire is less frequent in the moister forests to the east, where balsam fir — slow to colonize burned land — becomes a larger part of the forest mix.

The western boreal forest adjoins the foothills of the Rockies. Here, Engelmann spruce, lodgepole pine and alpine fir replace their close eastern relatives: white spruce, jack pine and balsam fir. Where the boreal forest meets the Prairies, it changes to stands of almost pure aspen, grading into parks dotted with grassy openings.

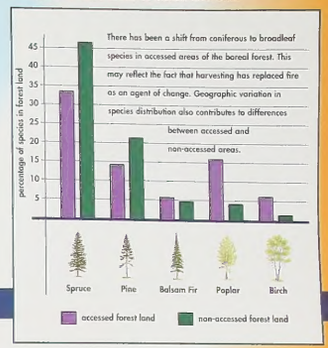
This dominance of a single species contrasts sharply with the broadleaved trees that invade the southern margins of the boreal shield in Ontario and Quebec. Here loggers and campers see sugar maple, red maple, beech, yellow birch, red oak, black ash, basswood, red and white pine and white cedar.

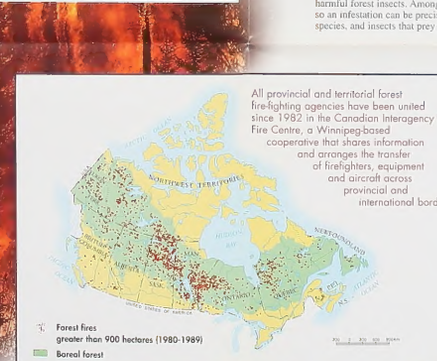
Winter is a challenge. Animals can hibernate beneath the snow, but trees get the full force of icy winds. If water freezes inside its cells, a plant dies. Some fill their cells with fluid similar to anti-freeze, but this works only if temperatures are above -40 C. True boreal species live through even lower temperatures by withdrawing water into the spaces between cells, where it freezes harmlessly.

Aspen and birch are pioneer species, well adapted to areas disturbed by people. A major shift from coniferous to mixed and broadleaf stands is occurring in cut-over portions of the boreal forest. New technology makes it easy to convert aspen into pulp, waferboard and other products. So maintaining boreal conifer forests is a tough task.

A greater threat is the change in the climate largely due to human activities, mostly the burning of fossil fuels and changes in how the land is used. Potential effects of global warming could include more fires and insects. Some scientists predict that Canada's boreal forest could largely be replaced by grasslands in the west and mixed forest in the east if carbon dioxide increases to twice its current level in the atmosphere.

Species distribution in accessed and non-accessed areas of boreal ecozones





All provincial and territorial forest fire-fighting agencies have been united since 1982 in the Canadian Interagency Forest Fire Centre, a Winnipeg-based cooperative that shares information and arranges the transfer of firefighters, equipment and aircraft across provincial and international borders.

Distribution of large forest fires over a decade

The endangered whooping crane (*Grus americana*) and threatened wood bison (*Bison bison athabascae*) are boreal species designated at risk by the Committee on the Status of Endangered Wildlife in Canada.

In recent years, logging practices have favoured the development of balsam fir over other species, particularly in the eastern parts of the boreal forest. Balsam fir is more vulnerable than spruce to the spruce budworm, and has therefore sustained extensive damage from this pest.

As called for in the National Forest Strategy, a network of 10 model forests has been established across the country to provide living laboratories for sustainable forestry.

Five of these are boreal and each represents a different social, economic and environmental milieu.

Canada's forest regions and model forests

Natural Resources Canada / Ressources naturelles Canada
Canadian Forest Service / Service canadien des forêts
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